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EPA Superfund
Record of Decision:

GEIGER (C & M OIL)
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RANTOULES, SC
06/01/1987

Text:
GEIGER (C&M OIL)
HOLLYWOOD, CHARLESTON COUNTY, SOUTH CAROLINA.

#DR
DOCUMENTS REVIEWED:

- REMEDIAL INVESTIGATION REPORT, GEIGER (C&M OIL) SITE

- FEASIBILITY STUDY, GEIGER (C&M OIL) SITE

- SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

- COMMUNITY RESPONSIVENESS SUMMARY

- STAFF RECOMMENDATIONS AND REVIEWS.

#DE
DECLARATIONS

CONSISTENT WITH THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (CERCLA), THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA), AND THE NATIONAL OIL AND HAZARDOUS SUBSTANCES CONTINGENCY PLAN (40 CFR PART 300), I HAVE DETERMINED THAT THE EXTRACTION AND TREATMENT OF GROUNDWATER AND THE EXCAVATION, ONSITE THERMAL DESTRUCTION, STABILIZATION/SOLIDIFICATION, AND BACKFILLING OF CONTAMINATED SOILS AT THE GEIGER (C&M OIL) SITE IS A COST-EFFECTIVE REMEDY WHICH USES ALTERNATIVE TECHNOLOGIES AND PERMANENT SOLUTIONS TO THE MAXIMUM EXTENT PRACTICABLE, AND PROVIDES ADEQUATE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. THE SELECTED ACTION WILL REQUIRE NO FURTHER OPERATION AND MAINTENANCE ACTIVITIES, OTHER THAN MONITORING.

EPA WILL FUND NINETY PERCENT OF THE COST OF IMPLEMENTING THIS REMEDIAL ACTION, AND THE STATE OF SOUTH CAROLINA WILL FUND THE REMAINING TEN PERCENT. EPA WILL FUND NINETY PERCENT OF THE COSTS OF THE FIRST YEAR OF MONITORING FOLLOWING COMPLETION OF REMEDIAL ACTIVITIES. THE STATE WILL FUND THE REMAINING TEN PERCENT, AND WILL FUND ONE-HUNDRED PERCENT OF THE COSTS OF MONITORING FOLLOWING THIS PERIOD.

THE STATE OF SOUTH CAROLINA HAS BEEN CONSULTED ON THE SELECTION OF THIS REMEDY, AND CONCURS WITH THE SELECTED REMEDIAL ACTION.

I HAVE ALSO DETERMINED THAT THE ACTION BEING TAKEN IS APPROPRIATE WHEN BALANCED AGAINST THE AVAILABILITY OF TRUST FUND MONIES FOR USE AT OTHER

SITES.

JUNE 1, 1987 JACK E. RAVAN

DATE REGIONAL ADMINISTRATOR.

RECORD OF DECISION
SUMMARY OF REMEDIAL ALTERNATIVE SELECTION
GEIGER (C&M OIL) SITE
CHARLESTON COUNTY, SOUTH CAROLINA

1.0 INTRODUCTION

THE GEIGER (C&M OIL) SITE WAS PROPOSED FOR INCLUSION ON THE NATIONAL PRIORITIES LIST (NPL) IN UPDATE NUMBER 1, SEPTEMBER 1983, AND RANKS 588 OUT OF 703 NPL SITES. THE GEIGER SITE HAS BEEN THE SUBJECT OF A REMEDIAL INVESTIGATION (RI) AND FEASIBILITY STUDY (FS) PERFORMED BY THE REGION IV REM II CONTRACTOR, CAMP, DRESSER & MCKEE, INC. (CDM). THE RI REPORT, WHICH EXAMINES AIR, SEDIMENT, SOIL, SURFACE WATER, AND GROUNDWATER CONTAMINATION AT THE SITE, WAS ISSUED JULY 1, 1986. THE FS, WHICH DEVELOPS AND EXAMINES ALTERNATIVES FOR REMEDIATION OF THE SITE, WAS ISSUED IN DRAFT FORM TO THE PUBLIC ON JANUARY 9, 1987.

THIS RECORD OF DECISION HAS BEEN PREPARED TO SUMMARIZE THE REMEDIAL ALTERNATIVE SELECTION PROCESS AND TO PRESENT THE SELECTED REMEDIAL ALTERNATIVE.

#SLD

1.1 SITE LOCATION AND DESCRIPTION

THE GEIGER (C&M OIL) SITE IS LOCATED IN CENTRAL CHARLESTON COUNTY, SOUTH CAROLINA, APPROXIMATELY TEN MILES WEST OF THE CITY OF CHARLESTON, ALONG HIGHWAY 162 (FIGURE 1). THE SITE IS IN A SPARSELY POPULATED RURAL AREA. ABOUT TEN RESIDENCES ARE LOCATED ADJACENT TO THE SITE TO THE EAST AND NORTHEAST. THE POPULATION IN THE IMMEDIATE SITE AREA IS ESTIMATED AT FORTY PERSONS. SEVERAL SMALL BUSINESSES ARE LOCATED WITHIN ONE-HALF MILE OF THE SITE ALONG HIGHWAY 162. THE TOWN OF HOLLYWOOD IS APPROXIMATELY FOUR MILES WEST OF THE SITE.

LAND USE IN THE VICINITY OF THE SITE IS PREDOMINANTLY MIXED CONIFEROUS AND DECIDUOUS FOREST. ESTUARINE STREAMS AND THEIR ASSOCIATED TIDAL WETLANDS ARE LOCATED APPROXIMATELY ONE MILE TO THE NORTH AND SOUTH OF THE SITE. THERE ARE NO MAJOR INDUSTRIES OR OTHER SOURCES OF EMPLOYMENT NEARBY. AGRICULTURAL LANDS AND BORROW PITS ARE SCATTERED WITHIN A ONE-MILE RADIUS OF THE SITE.

THE SITE COMPRISES A FIVE-ACRE AREA OF VERY LITTLE TOPOGRAPHIC RELIEF. ELEVATIONS ON THE SITE RANGE FROM APPROXIMATELY FIFTEEN TO THIRTY FEET

ABOVE MEAN SEA LEVEL. SURFACE WATER DRAINAGE IS INTO TWO ONSITE PONDS AND TO THE WEST AND NORTHWEST TOWARD THE WALLACE RIVER (FIGURES 2 AND 3), WHICH FLOWS INTO THE STONO RIVER. A MARSHY AREA IS FOUND WEST OF

THE SITE, AND SENSITIVE WETLAND ENVIRONMENTS ARE LOCATED IN THE WALLACE RIVER VICINITY. THESE WETLANDS ARE A CRITICAL HABITAT SUPPORTING SEVERAL FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES.

SEVERAL LAGOONS WERE CONSTRUCTED ON THE SITE BETWEEN 1969 AND 1971 FOR USE IN A WASTE OIL INCINERATION PROCESS. THESE UNLINED LAGOONS COVERED A TOTAL AREA OF APPROXIMATELY 5,000 SQUARE FEET, AND THEIR BOTTOMS WERE AT OR NEAR THE GROUNDWATER SURFACE. THE LAGOONS WERE FILLED WITH WASTE OIL, AND WERE LATER COVERED WITH LOCAL SOILS. THE SITE IS PRESENTLY BEING USED FOR EQUIPMENT STORAGE BY A PILE DRIVING COMPANY.

#SH
1.2 SITE HISTORY

IN MARCH 1969 THE SOUTH CAROLINA POLLUTION CONTROL AUTHORITY (SCPCA) PERMITTED ADAMS RUN SERVICES, INC. TO INCINERATE WASTE OIL AT WHAT IS NOW THE GEIGER SITE. SOMETIME BETWEEN 1969 AND 1971, EIGHT UNLINED LAGOONS, EACH APPROXIMATELY ONE FOOT DEEP AND COVERING A TOTAL AREA 50 FEET WIDE BY 100 FEET LONG, WERE CONSTRUCTED FOR THE PURPOSE OF HOLDING WASTE OIL IN CONNECTION WITH THE INCINERATION PROCESS.

IN LATE 1971 IN RESPONSE TO COMPLAINTS FROM AREA RESIDENTS, SCPCA ORDERED THAT ALL INCINERATION AND WASTE DEPOSITION ACTIVITIES AT THE SITE BE STOPPED, AND THE OWNER WAS TO TAKE ACTION TO PREVENT SPILLAGE, LEAKAGE, OR SEEPAGE OF OIL FROM THE SITE.

IN APRIL 1974 A NEARBY PROPERTY OWNER COMPLAINED TO THE CHARLESTON COUNTY HEALTH DEPARTMENT (CCHD) ABOUT OIL OVERFLOWING FROM THE LAGOONS ON THE SITE. CCHD INVESTIGATED AND ORDERED THE SITE CLOSED, CITING EVIDENCE OF RECENT OIL DUMPING AND OVERFLOWING OIL. C&M OIL DISTRIBUTORS, INC. THEN PURCHASED ALL RECLAIMABLE OIL ON THE SITE AND SUBMITTED RECOVERY PLANS TO THE SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (SCDHEC). THERE IS NO REPLY FROM SCDHEC ON RECORD.

IN DECEMBER 1979, SCDHEC REQUESTED C&M OIL TO PROVIDE INFORMATION ON THEIR PLANS FOR CLEANING UP THE SITE. C&M OIL REPLIED THAT THEY WERE UNABLE TO RECOVER THE WASTE OIL AND THAT THEY WERE NOT OBLIGATED TO CLEAN THE SITE.

EPA REGION IV BEGAN INVESTIGATING THE SITE IN FEBRUARY 1980. SAMPLES FROM TWO MONITORING WELLS INSTALLED DOWNGRADIENT OF THE SITE CONTAINED ORGANIC COMPOUNDS AND METALS WHICH WERE ALSO DETECTED IN THE WASTE PITS. RESIDENTIAL WELLS UPGRADIENT OF THE SITE WERE SAMPLED, BUT NO ORGANIC COMPOUNDS WERE DETECTED. METALS IN THESE RESIDENTIAL SAMPLES WERE AT BACKGROUND LEVELS. WASTE OIL IN THE LAGOONS WAS FOUND TO CONTAIN

CHEMICALS WHICH ARE SIMILAR TO THOSE ASSOCIATED WITH AUTOMOTIVE CRANKCASES, BRAKE FLUIDS, AND DEGREASING COMPOUNDS. THE TOTAL QUANTITY OF WASTE ON THE SITE WAS ESTIMATED AT 149,600 GALLONS, THE EQUIVALENT OF

2992 55-GALLON DRUMS. THE SITE WAS RANKED USING THE HAZARD RANKING SYSTEM (HRS), AND RECEIVED A SCORE OF 32.37.

THE SITE WAS PURCHASED IN MARCH 1982 BY GEORGE GEIGER, WHO IS THE PRESENT OWNER. MR. GEIGER PROPOSED EXCAVATION AND DISPOSAL OF CONTAMINATED SOIL IN THE LAGOONS, BUT NO FINAL APPROVAL WAS GIVEN BY SCDHEC.

IN 1983 MR. GEIGER FILLED THE LAGOONS WITH LOCAL SOILS, AND THE SITE HAS BEEN USED SINCE THEN FOR THE STORAGE OF EQUIPMENT USED BY HIS COMPANY, PILE DRIVERS, INC.

THE GEIGER (C&M OIL) SITE WAS PLACED ON THE NATIONAL PRIORITIES LIST ON SEPTEMBER 8, 1983. EPA ISSUED A WORK ASSIGNMENT IN OCTOBER 1984 TO THE REM II CONTRACTOR, CAMP, DRESSER & MCKEE, INC., TO PERFORM A REMEDIAL INVESTIGATION AND FEASIBILITY STUDY OF THE SITE. THIS TASK WAS ASSIGNED TO C.C. JOHNSON & MALHOTRA, P.C., OF SILVER SPRING, MARYLAND, A REM II TEAM MEMBER. THE FINAL RI REPORT WAS ISSUED JULY 1, 1986, AND THE DRAFT FS WAS RELEASED TO THE PUBLIC JANUARY 9, 1987.

THE OBJECTIVES OF THE SITE INVESTIGATION WERE:

- TO DETERMINE THE EXTENT OF CONTAMINATION OF THE SHALLOW AQUIFER;

- TO CHARACTERIZE THE HYDRAULIC CHARACTERISTICS OF THE SHALLOW AQUIFER;

- TO DETERMINE THE LATERAL EXTENT AND DEPTH OF SOIL CONTAMINATION ON THE SITE;

- TO DETERMINE WHETHER CONTAMINATION HAS MIGRATED OFF-SITE VIA SURFACE WATER RUNOFF; AND

- TO DETERMINE IF AIR CONTAMINATION FROM THE SITE IS OCCURRING.

THE PURPOSE OF THE FEASIBILITY STUDY WAS TO DEVELOP AND EXAMINE REMEDIAL ALTERNATIVES FOR THE SITE, AND TO SCREEN THESE ALTERNATIVES ON THE BASIS OF PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT, COST-EFFECTIVENESS, AND TECHNICAL IMPLEMENTABILITY. IN ACCORDANCE WITH THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (CERCLA), AS AMENDED BY THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA) ALTERNATIVES IN WHICH TREATMENT WOULD PERMANENTLY AND SIGNIFICANTLY REDUCE THE VOLUME, TOXICITY, OR MOBILITY OF THE HAZARDOUS SUBSTANCES AT THE SITE WERE PREFERRED OVER THOSE ALTERNATIVES NOT INVOLVING SUCH TREATMENT.

FURTHER INVESTIGATION WAS PERFORMED IN FEBRUARY 1987, TO SEARCH FOR

DRUMS WHICH WERE REPORTED TO BE BURIED ON THE SITE. THIS INVESTIGATION WAS IN RESPONSE TO COMMENTS MADE AT A PUBLIC MEETING HELD TO DISCUSS THE REMEDIAL ALTERNATIVES UNDER CONSIDERATION. NO BURIED DRUMS WERE

DISCOVERED ON OR NEAR THE SITE.

#ENF
2.0 ENFORCEMENT ANALYSIS

THE GEIGER (C&M OIL) SITE WAS ADDED TO THE NATIONAL PRIORITIES LIST (NPL) IN SEPTEMBER 1983 AND EPA ASSUMED LEAD RESPONSIBILITY FOR THE SITE AT THAT TIME. AN EPA CONTRACTOR COMPLETED A POTENTIALLY RESPONSIBLE PARTY SEARCH IN FEBRUARY 1984. NOTICE LETTERS WERE SENT OUT TO POTENTIALLY RESPONSIBLE PARTIES IN OCTOBER 1984. SINCE NO VIABLE PRPS WERE FOUND, EPA PROCEEDED TO CONDUCT THE RI/FS ITSELF. THE RI/FS COMMENCED IN JULY 1985.

#CSS
3.0 CURRENT SITE STATUS

3.1 HYDROGEOLOGIC SETTING

THE GEIGER (C&M OIL) SITE LIES IN THE ATLANTIC COASTAL PLAIN PHYSIOGRAPHIC PROVINCE. THE UPPERMOST AQUIFER AT THE SITE IS A SURFICIAL, UNCONFINED AQUIFER, APPROXIMATELY 40 TO 50 FEET THICK, COMPOSED OF CLEAN TO SILTY, FINE TO MEDIUM SAND WITH SOME MUD LENSES. DEPTH TO THE WATER SURFACE VARIES SEASONALLY, REACHING A MINIMUM OF ONE FOOT BELOW THE GROUND SURFACE. GROUNDWATER FLOW ACROSS THE SITE IS GENERALLY TO THE WEST AND NORTHWEST, DISCHARGING TO SURFACE WATERS IN THE WETLANDS OF THE WALLACE RIVER.

A HYDRAULIC CONDUCTIVITY OF 6.7 FEET PER DAY WAS DETERMINED USING A RISING HEAD TEST. ASSUMING AN AVERAGE POROSITY OF 41 PERCENT FOR MEDIUM TO FINE SAND AQUIFERS, AND A HYDRAULIC GRADIENT OF 0.003, A VELOCITY OF 0.05 FEET PER DAY WAS CALCULATED FOR GROUNDWATER FLOW. AT THIS RATE, GROUNDWATER AT THE SITE WOULD HAVE MOVED APPROXIMATELY 300 FEET SINCE WASTE WAS DEPOSITED ON THE SITE SIXTEEN YEARS AGO.

GROUNDWATER IN THE SURFICIAL AQUIFER HAS BEEN CLASSIFIED AS CLASS 1 GROUNDWATER UNDER EPA GROUNDWATER PROTECTION STRATEGY (GWPS) BECAUSE IT IS HIGHLY VULNERABLE TO CONTAMINATION AND IT DISCHARGES INTO WETLANDS INHABITED BY ENDANGERED SPECIES. THE SOUTH CAROLINA DEPARTMENT OF MARINE RESOURCES AND THE U.S. FISH AND WILDLIFE SERVICE HAVE IDENTIFIED BALD EAGLES IN THE AREA, AND REPORTED A LIKELIHOOD OF WOOD STORKS AND AMERICAN ALLIGATORS IN THE WETLANDS. AS CLASS I GROUNDWATER, A HIGH DEGREE OF PROTECTION WOULD BE AFFORDED THE AQUIFER, AND VERY STRINGENT CLEAN-UP GOALS MUST BE MET.

GROUNDWATER IN THE SURFICIAL AQUIFER IS ALSO A SOURCE OF DRINKING WATER

FOR RESIDENTS LIVING NEAR THE SITE. APPROXIMATELY TEN HOMES IMMEDIATELY UPGRADIENT OF THE SITE HAVE WELLS SUPPLIED BY THIS AQUIFER. SEVERAL RESIDENTIAL WELLS ARE ALSO LOCATED ONE MILE OR LESS DOWNGRADIENT OF THE

SITE. THE AQUIFER CLASSIFICATION AND CLEAN-UP GOALS ARE DISCUSSED IN MORE DETAIL IN SECTION 4.0.

THIS SURFICIAL AQUIFER IS UNDERLAIN BY THE COOPER MARL, WHICH ACTS AS A CONFINING LAYER IN THE AREA, SEPARATING THE SURFICIAL AQUIFER FROM LOWER FORMATIONS. THE COOPER MARL IS ESTIMATED TO BE 15 TO 60 FEET THICK AND OVERLIES SEVERAL TERTIARY FORMATIONS. THESE FORMATIONS ARE PREDOMINANTLY PURE TO VERY IMPURE LIMESTONE IN THE UPPER PART OF THE SECTION, AND SAND, SILT, AND CLAY IN THE LOWER PART. BELOW THE COOPER MARL ARE ADDITIONAL SAND, SILT, AND CLAY FORMATIONS DOWN TO THE BASEMENT ROCK, WHICH IS WELLINDURATED SEDIMENTARY AND IGNEOUS ROCK OR PRE-CRETACEOUS AGE.

3.2 SOIL CONTAMINATION

SOILS AT THE SITE ARE PREDOMINANTLY SANDY THROUGHOUT THEIR PROFILE, AND POSSESS RAPID PERMEABILITY. THE AREA OF HIGHEST SOIL CONTAMINATION IS IN THE OIL STAINED AREA SHOWN IN FIGURE 4, WHERE THE FORMER LAGOONS WERE LOCATED. SOIL CONTAMINATION WAS FOUND TO A LESSER DEGREE IN OTHER AREAS SHOWN IN THIS FIGURE. CONTAMINANTS INCLUDE VARIOUS ORGANIC COMPOUNDS, PCB-1254, AND HEAVY METALS (LEAD, MERCURY, CHROMIUM). THE CONTAMINANTS AND THE MAXIMUM CONCENTRATIONS DETECTED IN SOIL ON THE SITE ARE SHOWN IN TABLE 1.

THE DEPTH OF SOIL CONTAMINATION IS ESTIMATED TO BE FIVE FEET IN THE OIL-STAINED AREA AND ONE FOOT IN OTHER AREAS OF THE SITE INDICATED IN FIGURE 4. THE DEPTH OF CONTAMINATION IN THE OIL-STAINED AREA WAS ESTIMATED ON THE BASIS OF HISTORICAL AND VISUAL EVIDENCE. SAMPLES COULD NOT BE OBTAINED BELOW A DEPTH OF TWO FEET BECAUSE OF THE HIGH GROUNDWATER LEVEL. THE CONTAMINATED SOILS ARE BELIEVED TO BEHAVE AS A SOURCE MATERIAL, CONTRIBUTING CONTAMINATION TO THE GROUNDWATER.

3.3 SURFACE WATER AND SEDIMENT CONTAMINATION

LEAD WAS DETECTED AT ELEVATED CONCENTRATIONS IN TWO SURFACE WATER SAMPLES FROM THE SWAMP LOCATED NORTHWEST OF THE SITE, AND ELEVATED LEVELS OF LEAD WERE FOUND IN FOUR SEDIMENT SAMPLES FROM THIS AREA. THIS CONTAMINATION IS PROBABLY THE RESULT OF PAST SPILLS OR OF SURFACE WATER RUNOFF INTO THE SWAMP. MOST RUN-OFF FROM THE SITE WOULD BE INTERCEPTED BY THE ONSITE PONDS WHICH SHOWED NO ELEVATED LEVELS OF CONTAMINANTS; HOWEVER, LIMITED OFF-SITE SURFACE MIGRATION MAY BE PRESENTLY OCCURRING. THIS SWAMP IS NOT ASSOCIATED WITH THE WALLACE RIVER WETLANDS, AND IS NOT CONSIDERED TO BE A CRITICAL HABITAT AS THE WETLANDS ARE.

3.4 GROUNDWATER CONTAMINATION

THE APPROXIMATE EXTENT OF GROUNDWATER CONTAMINATION IS SHOWN IN FIGURE
1

5. GROUNDWATER FROM THE ONSITE SHALLOW WELL, MW-4S (FIGURE 5), WAS FOUND TO BE CONTAMINATED WITH SEVERAL ORGANIC COMPOUNDS. BENZENE WAS DETECTED AT 25 UG/L, WHICH IS ABOVE THE PROPOSED MAXIMUM CONTAMINANT

LEVEL (PMCL) OF 5 UG/L. TOLUENE WAS DETECTED AT THE PROPOSED MCL (PMCL) OF 2000 UG/L. SEVERAL OTHER ORGANIC COMPOUNDS WERE DETECTED ABOVE BACKGROUND LEVELS, AS SHOWN IN TABLE 2. BACKGROUND CONDITIONS ARE REPRESENTED BY MW-1, LOCATED HYDRAULICALLY UPGRADIENT OF THE SITE.

CONTAMINANTS WERE DETECTED AT LEVELS ABOVE BACKGROUND CONCENTRATIONS IN WELL CLUSTER MW-5. ALTHOUGH NOT ABOVE APPROPRIATE STANDARDS, THESE CONCENTRATIONS INDICATE MIGRATION OF CONTAMINATED GROUNDWATER OFF-SITE.

ARSENIC WAS DETECTED AT 66 UG/L, WHICH IS ABOVE THE MCL OF 50 UG/L, IN MW-2D. THE PRESENCE OF METALS OTHER THAN ARSENIC WAS NOT CONFIRMED BECAUSE OF SEDIMENTS INTRODUCED INTO SOME SAMPLES. THESE SEDIMENTS COULD BE THE SOURCE OF THE METALS DETECTED IN MW-5 AND MW-6.

SOIL IN THE OIL-STAINED AREA SHOWN IN FIGURE 4 IS IN CONTACT WITH THE GROUNDWATER. THIS CONTAMINATED SOIL IS CONSIDERED TO BE A SOURCE MATERIAL, CONTINUALLY INTRODUCING CONTAMINATION INTO THE GROUNDWATER.

3.5 RECEPTORS

RECEPTORS OF CONTAMINANTS ON AND NEAR THE GEIGER (C&M OIL) SITE MAY BE EXPOSED VIA FOUR DIFFERENT ROUTES: AIR, SOIL, GROUNDWATER, AND SURFACE WATER. BOTH ENVIRONMENTAL AND HUMAN RECEPTORS HAVE BEEN IDENTIFIED. THE PRIMARY HUMAN RECEPTORS ARE ONSITE WORKERS AND RESIDENTS WHO MAY COME INTO CONTACT WITH CONTAMINANTS THROUGH INHALATION OF DUST GENERATED BY WIND EROSION AND VEHICLE TRAFFIC, AND THROUGH DIRECT DERMAL CONTACT WITH CONTAMINATED SOIL. INGESTION OF CONTAMINATED SOIL IS ALSO POSSIBLE, ESPECIALLY IF CHILDREN WERE TO PLAY ON THE OIL-STAINED AREA.

POTENTIAL HUMAN RECEPTORS IDENTIFIED UNDER FUTURE-USE SCENARIOS INCLUDE THOSE IDENTIFIED ABOVE, AS WELL AS THOSE WHO MAY INGEST OR OTHERWISE COME INTO CONTACT WITH GROUNDWATER WHICH COULD BE PRODUCED FROM ONSITE WELLS. NO PRODUCING WELLS ARE PRESENT WITHIN THE GROUNDWATER CONTAMINATION PLUME AT THIS TIME, BUT DEVELOPMENT OF THIS SITE COULD LEAD TO THE PLACEMENT OF WELLS FOR HUMAN USE. USERS OF GROUNDWATER FROM OFF-SITE WELLS ARE ALSO POTENTIAL RECEPTORS, AS CONTAMINATED GROUNDWATER COULD MIGRATE TO RESIDENTIAL WELLS IF NO REMEDIAL ACTION IS TAKEN.

ENVIRONMENTAL RECEPTORS INCLUDE AQUATIC LIFE COMING INTO DIRECT CONTACT WITH OR INGESTING SURFACE WATER IN THE ONSITE PONDS, THE DISCHARGE STREAM, THE OILY PIT ON THE SITE, AND THE MARSHY AREA NEAR THE SITE. PLANTS AND AMPHIBIANS MAY CONTACT SEDIMENTS IN THE MARSHY AREA NEAR THE SITE, AND WILDLIFE MAY INGEST OR CONTACT CONTAMINATED SOIL IN THE OILY AREA.

THE ENVIRONMENTAL RECEPTORS OF GREATEST CONCERN ARE ENDANGERED SPECIES IN THE WETLANDS OF THE WALLACE RIVER. GROUNDWATER FROM THE SITE

DISCHARGES INTO THESE WETLANDS, AND CONTAMINANTS MAY AFFECT WETLANDS WILDLIFE BY THIS ROUTE. CONTAMINATED GROUNDWATER HAS NOT YET REACHED THESE WETLANDS, BUT MAY EVENTUALLY MIGRATE TO THIS AREA IF NOT

REMEDIATED.

3.6 WALLACE RIVER WETLANDS

WETLANDS OF THE WALLACE RIVER HAVE BEEN IDENTIFIED AS A SENSITIVE HABITAT WHICH MAY BE AFFECTED BY THE GEIGER (C&M OIL) SITE. THESE WETLANDS, SHOWN IN FIGURE 1, ARE LOCATED NORTH AND WEST OF THE SITE, WITHIN A TWO-MILE RADIUS OF THE SITE.

THE FOLLOWING FEDERALLY LISTED ENDANGERED SPECIES WERE DETERMINED BY THE U.S. FISH AND WILDLIFE SERVICE TO POSSIBLY OCCUR IN THE AREA OF INFLUENCE OF THE SITE: BALD EAGLE (HALIAEETUS LEUCOCEPHALUS), WOOD STORK (MYCTERIA AMERICANA), RED-COCKADED WOODPECKER (PICOIDES BOREALIS). THE AMERICAN ALLIGATOR (ALLIGATOR MISSISSIPPIENSIS) IS A THREATENED SPECIES WHICH MAY ALSO OCCUR IN THIS AREA. THESE SPECIES ARE ALL PROTECTED UNDER THE ENDANGERED SPECIES ACT AS AMENDED BY PUBLIC LAW 97-304. ADDITIONALLY, SEVERAL PLANTS, AMPHIBIANS, AND BIRDS ARE "STATUS REVIEW" SPECIES WHICH ARE NOT LEGALLY PROTECTED AT THIS TIME, BUT MAY BE LISTED AS ENDANGERED OR THREATENED IN THE FUTURE. THESE SPECIES ARE IDENTIFIED IN CORRESPONDENCE CONTAINED IN APPENDIX A.

THE SOUTH CAROLINA DEPARTMENT OF MARINE RESOURCES HAS IDENTIFIED BALD EAGLES IN THE WALLACE RIVER WETLANDS. ADULT PLUMAGE BIRDS HAVE BEEN SPOTTED, AND NESTING IS EXPECTED TO BE CONFIRMED SOON.

THESE WETLANDS MAY BE IMPACTED BY THE SITE BECAUSE THE SURFICIAL AQUIFER DISCHARGES INTO THE WETLANDS. IT IS THIS SURFICIAL AQUIFER WHICH IS CONTAMINATED AT THE GEIGER SITE. CONTAMINATED GROUNDWATER WAS DETERMINED TO BE MIGRATING OFF-SITE IN A GENERALLY WESTERLY AND NORTHWESTERLY DIRECTION. ALTHOUGH CONTAMINATED GROUNDWATER HAS NOT REACHED THE WETLANDS, CONTAMINATED GROUNDWATER MAY MIGRATE TO THAT AREA IF NOT REMEDIATED.

UNDER THE EPA GROUNDWATER PROTECTION STRATEGY, GROUNDWATER IN THIS SURFICIAL AQUIFER AT THE GEIGER SITE HAS BEEN CLASSIFIED AS CLASS I GROUNDWATER BECAUSE IT DISCHARGES INTO A SENSITIVE ENVIRONMENT, THE WALLACE RIVER WETLANDS, WITHIN A TWO-MILE RADIUS OF THE SITE.

4.0 CLEANUP CRITERIA

THE EXTENT OF CONTAMINATION WAS DEFINED IN SECTION 3.0, CURRENT SITE STATUS. THIS SECTION EXAMINES THE RELEVANCE AND APPROPRIATENESS OF WATER QUALITY CRITERIA UNDER THE CIRCUMSTANCES OF RELEASE OF CONTAMINANTS AT THIS SITE. BASED UPON CRITERIA FOUND TO BE RELEVANT AND APPROPRIATE, THE MINIMUM GOALS OF REMEDIAL ACTION AT THIS SITE HAVE BEEN DEVELOPED.

4.1 GROUNDWATER REMEDIATION

IN DETERMINING THE DEGREE OF GROUNDWATER CLEANUP, SECTION 121(D) OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA) REQUIRES THAT THE SELECTED REMEDIAL ACTIONS ESTABLISH A LEVEL OR STANDARD OF CONTROL WHICH COMPLIES WITH ALL "APPLICABLE AND RELEVANT OR APPROPRIATE REGULATIONS" (ARARS).

GROUNDWATER IN THE SURFICIAL AQUIFER IS CLASSIFIED AS CLASS I UNDER DRAFT GUIDELINES FOR GROUNDWATER CLASSIFICATION UNDER THE EPA GROUNDWATER PROTECTION STRATEGY (GWPS). CLASS I GROUNDWATER INCLUDES THAT WHICH IS HIGHLY VULNERABLE TO CONTAMINATION BECAUSE OF THE HYDROGEOLOGICAL CHARACTERISTICS OF THE AQUIFER, AND THAT WHICH IS ECOLOGICALLY VITAL IN THAT THE GROUNDWATER DISCHARGES TO AN AREA THAT SUPPORTS A UNIQUE HABITAT. GROUNDWATER IN THE SURFICIAL AQUIFER DISCHARGES INTO WETLANDS OF THE WALLACE RIVER WITHIN THE CLASSIFICATION REVIEW AREA, ENCOMPASSING A TWO MILE RADIUS OF THE SITE. THE SOUTH CAROLINA DEPARTMENT OF MARINE RESOURCES HAS DOCUMENTED THE USE OF THESE WETLANDS AS A FEEDING AREA FOR THE BALD EAGLE, WHICH IS ON THE NATIONAL ENDANGERED SPECIES LIST (SEE SECTION 3.6). ADULT PLUMAGE BIRDS HAVE BEEN IDENTIFIED, AND IT IS EXPECTED THAT NESTING WILL BE CONFIRMED SOON. THE U.S. FISH AND WILDLIFE SERVICE HAS NOTED THE LIKELIHOOD OF THE BALD EAGLE, WOOD STORK, AND RED-COCKADED WOODPECKER IN THESE WETLANDS; ALL ARE ENDANGERED SPECIES.

THE EPA GWPS ADVISES THAT THE VALUE TO SOCIETY OF CLASS I GROUNDWATER SUPPORTS RESTORATION OF THIS CONTAMINATED GROUNDWATER TO LEVELS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. SEVERAL CONTAMINANTS WERE DETECTED AT ELEVATED LEVELS, AS SHOWN IN TABLE 2. BASED UPON GROUNDWATER CLASSIFICATION, REMEDIATION OF THE GROUNDWATER TO REDUCE CONTAMINANTS TO LEVELS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT WOULD BE NECESSARY. GROUNDWATER CLEANUP GOALS GIVEN IN TABLE 3 MEET THESE REQUIREMENTS.

THE SURFICIAL AQUIFER AT THE GEIGER (C&M OIL) SITE IS ALSO A CURRENT SOURCE OF DRINKING WATER. NINE RESIDENTIAL WATER-SUPPLY WELLS ARE LOCATED UPGRADIENT OF THE SITE WITHIN THE TWO-MILE CLASSIFICATION REVIEW AREA. SEVERAL RESIDENTIAL WELLS ARE LOCATED DOWNGRADIENT OF THE SITE WITHIN THIS AREA, APPROXIMATELY THREE-QUARTERS OF A MILE WEST OF THE SITE. THESE WELLS ARE COMPLETED IN THE SURFICIAL AQUIFER AND ARE A PRESENT SOURCE OF DRINKING WATER. RCRA REGULATIONS REQUIRE CLEAN-UP OF CONTAMINATED GROUNDWATER TO BACKGROUND LEVELS OR MCLS FOR CERTAIN LISTED CONTAMINANTS. THE PRESENCE OF CONTAMINANTS AT ELEVATED LEVELS IN GROUNDWATER AT THE GEIGER SITE WILL REQUIRE TREATMENT TO REDUCE CONTAMINANTS TO APPROPRIATE LEVELS AS SPECIFIED IN TABLE 3.

AMENDED 12 JUNE 1987

THE CONCLUSION OF THE ABOVE DISCUSSION IS THAT A NO-ACTION ALTERNATIVE

FOR GROUNDWATER WOULD BE OUT OF COMPLIANCE WITH SECTION 121 OF SARA, WHICH REQUIRES CLEAN-UP OF CONTAMINATED GROUNDWATER TO LEVELS WHICH ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. CLASSIFICATION OF THE

GROUNDWATER AND THE POTENTIAL FUTURE USE OF THE GROUNDWATER INDICATES THAT PRESENT CONTAMINANT LEVELS IN THE GROUNDWATER ARE NOT ACCEPTABLE.

INDICATOR CHEMICALS WERE USED TO ESTABLISH CLEANUP GOALS FOR GROUNDWATER. INDICATOR CHEMICALS WERE SELECTED ON THE BASIS OF WHICH CHEMICALS POSE THE GREATEST POTENTIAL HEALTH RISK AT THE GEIGER SITE. THESE INDICATOR CHEMICALS INCLUDE THOSE DEVELOPED IN THE PUBLIC HEALTH EVALUATION. TOLUENE AND 1,1-DICHLOROBENZENE WERE INCLUDED BECAUSE MAXIMUM CONCENTRATIONS FOR THESE COMPOUNDS HAVE BEEN ESTABLISHED BASED ON AQUATIC LIFE CHRONIC TOXICITY VALUES.

FOR CARCINOGENIC CONTAMINANTS, A 10-5 RISK LEVEL WAS DEEMED APPROPRIATE FOR GROUNDWATER REMEDIATION. EPA'S DRAFT "GUIDANCE ON REMEDIAL ACTIONS FOR CONTAMINATED GROUNDWATER AT SUPERFUND SITES" (OCTOBER 1986) SPECIFIES THAT GROUNDWATER REMEDIATION SHOULD ACHIEVE A LEVEL OF PROTECTION IN THE 10-4 TO 10-7 EXCESS CANCER RISK RANGE, WITH 10-6 BEING USED AS A POINT OF DEPARTURE. GROUNDWATER IN THE CONTAMINATED SURFICIAL AQUIFER IS NOT USED BY HUMAN RECEPTORS IMMEDIATELY DOWNGRADIENT OF THE SITE, AND NATURAL ATTENUATION WILL LOWER CONTAMINANT CONCENTRATIONS BEFORE GROUNDWATER MIGRATES FROM THE SITE TO EXISTING RESIDENTIAL WELLS OR SENSITIVE WETLANDS. THEREFORE, A 10-5 RISK LEVEL IS SUFFICIENT FOR PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. A HIGHER RISK LEVEL WOULD NOT BE ACCEPTABLE BECAUSE OF THE POSSIBILITY THAT WELLS MAY BE PLACED NEAR THE SITE. THE GEIGER SITE IS IN A LIGHTLY POPULATED AREA, BUT RESIDENCES ARE LOCATED NEAR THE SITE.

LEVELS PRESENTED AS GROUNDWATER CLEANUP GOALS ARE BASED ON FOUR CRITERIA: PROPOSED RECOMMENDED MAXIMUM CONTAMINANT LEVELS (PRMCLS); 10-5 CANCER RISK FOR CARCINOGENS; MAXIMUM CONTAMINANT LEVELS (MCLS) ESTABLISHED UNDER THE SAFE DRINKING WATER ACT; AND AQUATIC LIFE CHRONIC TOXICITY VALUES. INDICATOR CHEMICALS, MAXIMUM CONCENTRATIONS DETECTED IN GROUNDWATER AT THE GEIGER SITE, AND THE CLEANUP GOALS FOR THESE CHEMICALS ARE PRESENTED IN TABLE 3.

SPECIFIC QUANTITATIVE DATA FOR ALL POLYAROMATIC HYDROCARBONS (PAHS) IS NOT AVAILABLE, SO ALL CARCINOGENIC PAHS ARE CONSIDERED TO HAVE A CARCINOGENIC POTENCY EQUIVALENT TO THAT OF BENZO(A)PYRENE.

THIS FORMS THE BASIS OF THE CLEANUP GOAL FOR BENZO(A)ANTHRACENE AND BENZO(B AND/OR K)FLUORANTHENE. THE SUM OF ALL CARCINOGENIC PAHS SHOULD NOT EXCEED A 10-5 RISK LEVEL.

BASED ON LIMITED DATA, THE EPA ENVIRONMENTAL CRITERIA AND ASSESSMENT OFFICE CONCLUDED THAT 1,1-DICHLOROETHANE MAY HAVE THE POTENTIAL FOR CARCINOGENIC ACTIVITY IN EXPERIMENTAL ANIMALS. HOWEVER, DATA WERE INADEQUATE FOR QUANTITATIVE RISK ASSESSMENT. THEREFORE, THE CLEANUP GOAL WILL BE TO THE LOWEST LEVEL PRACTICAL, REPRESENTED BY THE REQUIRED

CLP DETECTION LIMIT.

AMENDED 12 JUNE 1987

4.2 SOIL REMEDIATION

THE PUBLIC HEALTH ASSESSMENT IN THE RI REPORT DETERMINED THAT RISKS TO HUMAN HEALTH AS A RESULT OF EXPOSURE TO ONSITE CONTAMINANTS VIA INHALATION, INGESTION, AND DERMAL CONTACT ARE AT ACCEPTABLE LEVELS UNDER PRESENT-USE CONDITIONS AT THE SITE. HOWEVER, UNDER A FUTURE-USE SCENARIO IN WHICH THE SITE MAY BE DEVELOPED, AN UNDUE RISK MIGHT BE POSED FROM EXPOSURE TO CONTAMINANTS IN THE SOIL. REMEDIATION OR INSTITUTIONAL CONTROLS WILL BE NECESSARY TO ASSURE THAT AN INCREASED RISK TO HUMAN HEALTH IS NOT POSED IN THE FUTURE.

CONTAMINANTS REMAINING IN THE SOIL FOLLOWING GROUNDWATER REMEDIATION MAY, OVER TIME, LEACH INTO THE GROUNDWATER. A MODEL WAS DEVELOPED TO CALCULATE CONTAMINANT CONCENTRATIONS IN SOIL AT THE GEIGER SITE THAT WOULD NOT RESULT IN FUTURE EXCEEDANCES OF GROUNDWATER CLEANUP GOALS. THESE SOIL CONTAMINANT CONCENTRATIONS FOR INDICATOR CHEMICALS ARE SHOWN IN TABLE 4 AND ARE CONSIDERED TO BE PRELIMINARY SOIL CLEANUP GOALS.

THESE PRELIMINARY GOALS WERE DEVELOPED USING LIMITED DATA, AND WILL BE SUBJECT TO REFINEMENT DURING REMEDIAL DESIGN. IF INFORMATION GATHERED DURING DESIGN ALLOWS MORE ACCURATE DEVELOPMENT OF CLEANUP GOALS, THESE LEVELS WILL BE REVISED ACCORDINGLY.

THE PURPOSE OF DEVELOPING THE PRELIMINARY GOALS WAS TO DETERMINE THE NEED FOR AND THE EXTENT OF SOIL REMEDIATION. AS TABLE 4 INDICATES, SEVERAL OF THE INDICATOR CHEMICALS ARE ABOVE THE SOIL PROTECTIVE LEVELS. IF NO SOIL REMEDIATION WAS IMPLEMENTED, LEACHING OF CONTAMINANTS FROM THE SOIL INTO THE GROUNDWATER WOULD OCCUR, AND CONTAMINANT LEVELS IN THE GROUNDWATER COULD EXCEED GROUNDWATER CLEANUP GOALS.

THE AREAS SHOWN IN FIGURE 4 CONTAIN CONTAMINANTS IN EXCESS OF THE PROTECTIVE LEVELS IN TABLE 4. SOIL IN THESE AREAS MUST BE TREATED TO REDUCE CONTAMINANTS TO LEVELS AT OR BELOW THE PRELIMINARY CLEANUP GOALS.

THE DEVELOPMENT OF THE PRELIMINARY SOIL CLEANUP GOALS IS DISCUSSED IN MORE DETAIL IN APPENDIX C.

4.3 SWAMP REMEDIATION

OFF-SITE MIGRATION OG METALS HAS OCCURRED INTO THE SWAMP AREA WEST OF THE SITE. ALTHOUGH LEAD WAS DETECTED ABOVE AQUATIC LIFE CHRONIC TOXICITY VALUES IN SURFACE WATER IN THE SWAMP, NO ADVERSE ENVIRONMENTAL EFFECTS HAVE BEEN NOTED TO DATE. THE CONTAMINANT LEVELS IN THE SWAMP ARE EXPECTED TO GRADUALLY DECLINE, AS MIGRATION OF CONTAMINANTS IS NOT LIKELY TO BE OCCURRING AT THE PRESENT TIME. MOST SURFACE RUN-OFF FROM THE CONTAMINATED SOIL IS CAPTURED BY THE ON-SITE PONDS.

THE SWAMP AREA WILL NOT BE REMEDIATED BECAUSE ADVERSE ENVIRONMENTAL IMPACTS ASSOCIATED WITH EXCAVATION OF THESE AREAS WOULD BE GREATER THAN

BENEFITS WHICH WOULD BE ATTAINED. EXCAVATION OF CONTAMINATED SEDIMENTS WOULD REQUIRE CLEARING THE VEGETATIVE COVER AND WOULD DISRUPT THE HABITAT AND FEEDING GROUNDS OF A WIDE VARIETY OF WILDLIFE IN THIS SWAMP. THE BENEFITS TO BE OBTAINED BY SWAMP REMEDIATION WOULD BE EXCEEDED BY THE ADVERSE ENVIRONMENTAL IMPACTS WHICH WOULD BE REALIZED. THUS, IT WAS CONCLUDED THAT REMEDIATION OF THIS AREA IS NOT NECESSARY.

#AE

5.0 ALTERNATIVES EVALUATION

THE PURPOSE OF REMEDIAL ACTION AT THE GEIGER (C&M OIL) SITE IS TO MITIGATE AND MINIMIZE CONTAMINATION IN THE SOILS AND GROUNDWATER, AND TO REDUCE POTENTIAL RISKS TO HUMAN HEALTH AND THE ENVIRONMENT. THE FOLLOWING CLEANUP OBJECTIVES WERE DETERMINED BASED ON REGULATORY REQUIREMENTS AND LEVELS OF CONTAMINATION FOUND AT THE SITE:

- TO PROTECT THE PUBLIC HEALTH AND THE ENVIRONMENT FROM EXPOSURE TO CONTAMINATED ONSITE SOILS THROUGH INHALATION, DIRECT CONTACT, AND EROSION OF SOILS INTO SURFACE WATERS AND WETLANDS;

- TO PREVENT OFF-SITE MOVEMENT OF CONTAMINATED GROUNDWATER.

- TO RESTORE CONTAMINATED GROUNDWATER TO LEVELS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT.

AN INITIAL SCREENING OF APPLICABLE TECHNOLOGIES WAS PERFORMED TO IDENTIFY THOSE WHICH BEST MEET THE CRITERIA OF SECTION 300.68 OF THE NATIONAL CONTINGENCY PLAN (NCP). FOLLOWING THE INITIAL SCREENING OF TECHNOLOGIES, POTENTIAL REMEDIAL ACTION ALTERNATIVES WERE IDENTIFIED AND ANALYZED. THESE ALTERNATIVES WERE SCREENED AND THOSE WHICH BEST SATISFIED THE CLEANUP OBJECTIVES, WHILE ALSO BEING COST EFFECTIVE AND TECHNICALLY FEASIBLE, WERE DEVELOPED FURTHER.

TABLE 5 SUMMARIZES THE RESULTS OF THE SCREENING PROCESS. EACH OF THE REMAINING ALTERNATIVES FOR SOIL AND GROUNDWATER REMEDIATION WAS EVALUATED BASED UPON COST, TECHNICAL FEASIBILITY, INSTITUTIONAL REQUIREMENTS, AND DEGREE OF PROTECTION OF PUBLIC HEALTH AND THE ENVIRONMENT. A COST SUMMARY IS PRESENTED IN TABLE 6.

5.1 GROUP A ALTERNATIVES - GROUNDWATER REMEDIATION

ALTERNATIVE A-1: GROUNDWATER EXTRACTION, OPTIONAL FLOCCULATION/SEDIMENTATION, AIR STRIPPING, AND DISPOSAL

THIS ALTERNATIVE WOULD TREAT GROUNDWATER AT THE SITE BY REMOVING

VOLATILE ORGANIC COMPOUNDS (VOCS). GROUNDWATER WOULD BE TREATED TO CLEANUP GOALS ESTABLISHED IN SECTION 4.

ALL MONITORING WELLS WOULD BE SAMPLED AND ANALYZED DURING OR PRIOR TO REMEDIAL DESIGN. FLOCCULATION/SEDIMENTATION AND FILTERING WOULD BE ADDED TO THE TREATMENT SYSTEM IF METALS ARE DETECTED AT LEVELS WHICH WOULD POSE A RISK TO HUMAN HEALTH, OR AT LEVELS WHICH COULD BE TOXIC TO WILDLIFE.

GROUNDWATER WOULD BE PUMPED FROM SEVERAL ONSITE WELLS AT A RATE OF 60 GALLONS PER MINUTE (GPM). IF FLOCCULATION/SEDIMENTATION IS USED, THE WATER WOULD BE PUT INTO A STORAGE TANK. LIME AND A POLYMER WOULD BE ADDED TO WATER TAKEN FROM THE TANK, RESULTING IN AGGREGATION AND SETTLEMENT OF INSOLUBLE METAL CONTAMINANTS IN THE WATER.

THE WATER WOULD SPREAD OVER PLASTIC MEDIA IN THE COLUMN AS IT FALLS, WHILE AIR BLOWN UPWARD THROUGH THE COLUMN REMOVES THE VOLATILE CONTAMINANTS BY MASS TRANSFER. THE TREATED GROUNDWATER WOULD BE DISCHARGED TO THE STREAM WEST OF THE SITE.

THE RECOMMENDED ALTERNATIVE IS FOR EXTRACTION, TREATMENT, AND DISCHARGE OF GROUNDWATER. EXTRACTION AND DISCHARGE WILL BE AS OUTLINED ABOVE, BUT THE ACTUAL TREATMENT SYSTEM WILL BE CHOSEN AS A RESULT OF TREATABILITY STUDIES TO BE PERFORMED ON CONTAMINATED GROUNDWATER FROM THE SITE.

THE VOLUME OF CONTAMINATED GROUNDWATER IS ESTIMATED TO BE APPROXIMATELY 62 MILLION GALLONS. PUMPING WOULD CONTINUE UNTIL THE INDICATOR CHEMICAL CONCENTRATIONS ARE AT OR BELOW THE CLEANUP GOALS SPECIFIED IN TABLE 3.

ALTERNATIVE A-2: GROUNDWATER EXTRACTION, OPTIONAL FLOCCULATION/SEDIMENTATION, CARBON ADSORPTION, AND DISPOSAL

THIS ALTERNATIVE INCLUDES TREATMENT OF EXTRACTED GROUNDWATER BY FLOCCULATION AND SEDIMENTATION TO REMOVE METALS IF, DURING PRE-DESIGN SAMPLING OF MONITORING WELLS, IT IS DETERMINED THAT METALS ARE PRESENT ABOVE THE GROUNDWATER CLEANUP GOALS, OR THAT DISCHARGE OF WATER CONTAINING UNTREATED METALS WOULD PRESENT A THREAT TO THE ENVIRONMENT. THE CARBON ADSORPTION PROCESS WOULD REMOVE VOLATILE AND EXTRACTABLE ORGANICS. ALL ORGANIC CONTAMINANTS WOULD BE REMOVED TO LEVELS AT OR BELOW CLEANUP GOALS ESTABLISHED IN SECTION 4. IF USED, FLOCCULATION/SEDIMENTATION WOULD ALSO REMOVE METALS TO LEVELS BELOW CLEANUP GOALS. GROUNDWATER WOULD BE PUMPED FROM SEVERAL ON-SITE WELLS AT A RATE OF 60 GPM TO A STORAGE TANK. IF THE FLOCCULATION/SEDIMENTATION OPTION IS USED, LIME AND A POLYMER WOULD BE ADDED TO WATER TAKEN FROM THE STORAGE TANK, RESULTING IN AGGREGATION AND SETTLEMENT OR INSOLUBLE METAL CONTAMINANTS IN THE WATER. THIS WATER WOULD THEN PASS THROUGH COLUMNS OF GRANULAR ACTIVATED CARBON (GAC), WHICH WOULD ADSORB ORGANIC COMPOUNDS IN THE WATER. TREATED WATER WOULD BE DISCHARGED TO THE STREAM WEST OF THE SITE.

THE ESTIMATED VOLUME OF WATER TO BE PUMPED UNDER THIS ALTERNATIVE IS 62 MILLION GALLONS.

THE RECOMMENDED ALTERNATIVE IS FOR EXTRACTION, TREATMENT, AND DISCHARGE OF GROUNDWATER. EXTRACTION AND DISCHARGE WILL BE AS OUTLINED ABOVE, BUT THE ACTUAL TREATMENT SYSTEM WILL BE CHOSEN AS A RESULT OF TREATABILITY STUDIES TO BE PERFORMED ON CONTAMINATED GROUNDWATER FROM THE SITE.

ALTERNATIVE A-3 - GROUNDWATER EXTRACTION AND TREATMENT AT PRIVATELY-OWNED TREATMENT WORKS (POTW):

THIS ALTERNATIVE WOULD INVOLVE TREATMENT OF GROUNDWATER AT AN EXISTING LOCAL PUBLICLY-OWNED TREATMENT WORKS (POTW). GROUNDWATER WOULD BE PUMPED FROM SEVERAL ON-SITE WELLS AT A RATE OF 60 GPM AND WOULD BE CONVEYED BY AN IRON PIPELINE TO A SEWER LINE SIX MILES FROM THE SITE.

A RISK OF SPREADING CONTAMINATION WOULD EXIST, AS LEAKS COULD OCCUR IN THE PIPELINE OR SEWER, ALLOWING UNTREATED GROUNDWATER TO ESCAPE INTO THE ENVIRONMENT. THE POTW DOES NOT CURRENTLY ACCEPT INDUSTRIAL WASTE AND HAS INDICATED A RELUCTANCE IN ACCEPTING WASTE FROM THE GEIGER (C&M OIL) SITE. ALSO, ALTERNATIVE A-2 (ABOVE) PROVIDES THE SAME LEVEL OF REMEDIATION, AT RELATIVELY LITTLE COST INCREASE, WITHOUT THE ENVIRONMENTAL RISKS ASSOCIATED WITH OFF-SITE TRANSPORT OF CONTAMINATED GROUNDWATER. FOR THESE REASONS, THIS ALTERNATIVE HAS BEEN REJECTED.

ALTERNATIVE A-4 - SLURRY WALL AND CAP

THIS ALTERNATIVE WOULD NOT TREAT GROUNDWATER, BUT WOULD REDUCE THE MIGRATION OF CONTAMINATION BY PREVENTING GROUNDWATER MOVEMENT THROUGH THE AREA ENCLOSED BY THE SLURRY WALL, AND BY REDUCING INFILTRATION OF SURFACE WATER CONTAMINATED GROUNDWATER WOULD REMAIN ON-SITE.

A CIRCUMFERENTIAL SLURRY WALL OF LOW PERMEABILITY WOULD BE PLACED AROUND THE PERIMETER OF THE GROUNDWATER CONTAMINATION PLUME. THE WALL WOULD EXTEND INTO THE COOPER MARL, A FORMATION OF LOW-PERMEABILITY WHICH LIES AT A DEPTH OF ABOUT 50 FEET. A IMPERMEABLE CAP, CONSISTING OF 24 INCHES OF COMPACTED CLAY, A 20-MIL SYNTHETIC LINER, 12 INCHES OF GRAVEL, A GEOTEXTILE FABRIC LAYER, AND AN 18-INCH VEGETATED TOPSOIL LAYER, WOULD BE PLACED OVER THE AREA BOUNDED BY THE SLURRY WALL. THIS CAP WOULD GREATLY REDUCE INFILTRATION OF PRECIPITATION, AND LATERAL AND VERTICAL MIGRATION OF CONTAMINATED GROUNDWATER WOULD BE IMPEDED BY THE SLURRY WALL AND THE COOPER MARL, RESPECTIVELY.

SOIL REMEDIATION WOULD NOT BE REQUIRED UNDER THIS ALTERNATIVE, AS THE AREAS OF HIGHEST SOIL CONTAMINATION WOULD BE COVERED BY THE CAP, PREVENTING THE SPREAD OF CONTAMINATED SOILS. HOWEVER, AREAS OF LESSER SOIL CONTAMINATION WOULD REMAIN IN PLACE AND CONTAMINATED GROUNDWATER OUTSIDE OF THE SLURRY WALL WOULD CONTINUE TO MIGRATE OFF-SITE.

THIS ALTERNATIVE HAS BEEN REJECTED BECAUSE CONTAMINATED GROUNDWATER AND SOILS WOULD REMAIN ON-SITE, AND NOT ALL GROUNDWATER WOULD BE REMEDIATED. IN ADDITION, THE EXPECTED EFFECTIVE LIFE OF THE SLURRY WALL AND CAP IS

ONLY THIRTY YEARS. SHOULD FAILURE OCCUR, CONTAMINANTS WOULD BE FREE TO MIGRATE OFF-SITE.

5.2 GROUP B ALTERNATIVES - SOIL REMEDIATION

ALTERNATIVE B-1: CAP

THIS ALTERNATIVE WOULD INVOLVE CONSTRUCTION OF A THREE-LAYERED CAP OVER THE AREA OF HIGHEST SOIL CONTAMINATION, THUS REDUCING THE RISK OF HUMAN AND ENVIRONMENTAL CONTACT WITH CONTAMINATED SOILS. INFILTRATION OF SURFACE WATER AND THE RESULTANT PRODUCTION OF LEACHATE WOULD BE REDUCED.

A CAP CONFORMING TO RCRA GUIDELINES WOULD BE CONSTRUCTED OVER A 1.2-ACRE AREA OF SOIL CONTAMINATION. THIS WOULD BE THE OIL-STAINED AREA ON THE SITE. THE CAP WOULD CONSIST OF A TWO-FOOT THICK COMPACTED CLAY LAYER, A TWENTY-MIL SYNTHETIC LINER, AND A ONE-FOOT THICK GRAVEL DRAINAGE LAYER.

OVERLYING THESE WOULD BE GEOTEXTILE FABRIC AND EIGHTEEN INCHES OF TOPSOIL. THE TOPSOIL WOULD BE GRADED TO A TWO PERCENT SLOPE AND VEGETATED TO PROMOTE RUN-OFF AND CONTROL EROSION. HUMAN AND ENVIRONMENTAL CONTACT WITH CONTAMINATED SOIL BENEATH THE CAP WOULD BE ELIMINATED. INFILTRATION OF SURFACE WATER WOULD BE GREATLY REDUCED DUE TO THE DESIGN OF THE CAP.

THIS ALTERNATIVE IS ELIMINATED FROM CONSIDERATION BECAUSE AREAS OF SOIL CONTAMINATION OUTSIDE THE OIL-STAINED AREA WOULD STILL SUBJECT HUMAN AND ENVIRONMENTAL RECEPTORS TO THE RISK OF CONTACT WITH CONTAMINANTS. ALSO, GROUNDWATER WOULD CONTINUE TO BE CONTAMINATED AS IT FLOWS LATERALLY ACROSS THE SITE, COMING INTO CONTACT WITH THE SOIL BENEATH THE CAP. CONTAMINANTS WOULD REMAIN ON-SITE AND CONTINUE TO ACT AS A SOURCE OF GROUNDWATER CONTAMINATION. ALSO A PERMANENT REMEDY IS PRACTICABLE AND MEETS THE REQUIREMENTS OF SARA, SECTION 121.

ALTERNATIVE B-2: VEGETATIVE OR GRAVEL COVER

UNDER THIS ALTERNATIVE, A VEGETATIVE OR GRAVEL COVER WOULD BE PLACED OVER THE HIGHLY-CONTAMINATED OIL-STAINED AREA, PREVENTING HUMAN AND ENVIRONMENTAL CONTACT WITH THE COVERED SOIL.

A VEGETATIVE COVER WOULD BE CONSTRUCTED BY PLACING AN 18-INCH LAYER OF TOPSOIL OVER THE OIL-STAINED AREA. THIS TOPSOIL WOULD BE GRADED TO A 2-PERCENT SLOPE AND VEGETATED. A DIVERSION DITCH WOULD BE CONSTRUCTED AT THE HIGHER END OF THE COVER TO REDUCE RUN-ON OF SURFACE WATER FROM OTHER AREAS OF THE SITE.

AN OPTIONAL COVER OF GRAVEL RATHER THAN VEGETATED TOPSOIL WOULD ALLOW CURRENT USE OF THE SITE FOR EQUIPMENT STORAGE TO CONTINUE.

BOTH TYPES OF COVER ARE ELIMINATED FROM CONSIDERATION BECAUSE CONTAMINATED SOIL WOULD REMAIN ON-SITE AND WOULD ACT AS A SOURCE OF

CONTINUING CONTAMINATION OF GROUNDWATER. CONTAMINATED SOIL OUTSIDE THE OIL-STAINED AREA WOULD REMAIN IN ITS CURRENT CONDITION, POSING A POTENTIAL RISK OF EXPOSURE TO HUMAN AND ENVIRONMENTAL RECEPTORS. INFILTRATION OF PRECIPITATION WOULD CONTINUE, WITH THE POSSIBILITY OF RESULTANT LEACHATE GENERATION. GROUNDWATER WOULD CONTINUE TO COME INTO CONTACT WITH CONTAMINATED SOIL BENEATH THE COVER. ALSO, A PERMANENT REMEDY IS PRACTICABLE AND MEETS THE REQUIREMENTS OF SARA, SECTION 121.

ALTERNATIVE B-3: PARTIAL EXCAVATION, ON-SITE DISPOSAL, AND CAP

THIS ALTERNATIVE WOULD INVOLVE PLACEMENT OF CONTAMINATED SOILS WHICH ARE OUTSIDE THE OIL-STAINED AREA ONTO THE OIL-STAINED AREA, AND THEN CAPPING THE AREA.

APPROXIMATELY 53,000 CUBIC FEET OF CONTAMINATED SOIL WOULD BE EXCAVATED AND PLACED OVER THE CONTAMINATED SOIL IN THE OIL-STAINED AREA. THIS AREA IS ABOUT 1.2 ACRES IN SIZE. A CAP CONFORMING TO RCRA STANDARDS, AS DESCRIBED IN ALTERNATIVE B-1, WOULD BE CONSTRUCTED OVER THIS AREA.

THIS CAP WOULD PREVENT HUMAN AND ENVIRONMENTAL CONTACT WITH ANY CONTAMINATED SOIL ON THE SITE. HOWEVER, CONTAMINANTS WOULD STILL BE PRESENT AS A SOURCE MATERIAL, CONTACTING AND CONTAMINATING THE GROUNDWATER. THIS IS NOT A PERMANENT REMEDY, WHEREAS A PERMANENT REMEDY WHICH MEETS THE REQUIREMENTS OF SARA, SECTION 121, IS PRACTICABLE AT THIS SITE. THEREFORE, THIS ALTERNATIVE IS ELIMINATED FROM CONSIDERATION.

ALTERNATIVE B-4: PARTIAL EXCAVATION, ON-SITE DISPOSAL, AND VEGETATIVE OR GRAVEL COVER

UNDER THIS ALTERNATIVE, THE OIL-STAINED AREA WOULD BE COVERED WITH CONTAMINATED SOILS FROM OTHER AREAS OF THE SITE. A VEGETATIVE OR GRAVEL COVER WOULD BE PLACED OVER THESE SOILS IN THE MANNER DESCRIBED UNDER ALTERNATIVE B-2. HUMAN AND ENVIRONMENTAL CONTACT WITH CONTAMINATED SOIL WOULD BE ELIMINATED.

THIS ALTERNATIVE IS ELIMINATED FROM CONSIDERATION BECAUSE CONTAMINANTS WOULD REMAIN ON THE SITE AS A SOURCE MATERIAL, CONTRIBUTING TO GROUNDWATER CONTAMINATION. SOILS BENEATH THE SITE WOULD CONTINUE TO CONTACT GROUNDWATER, AND PRECIPITATION WOULD CONTINUE TO INFILTRATE THE SOILS, PRODUCING CONTAMINATED LEACHATE. ALSO, A PERMANENT REMEDY MEETING THE REQUIREMENTS OF SARA, SECTION 121, IS PRACTICABLE AT THIS SITE.

ALTERNATIVE B-5: EXCAVATION, ON-SITE THERMAL DESTRUCTION, AND STABILIZATION/SOLIDIFICATION

THIS ALTERNATIVE WOULD CONSIST OF EXCAVATION OF ALL CONTAMINATED SOILS ON THE SITE, THERMAL DESTRUCTION OF THESE SOILS IN AN ON-SITE MOBILE THERMAL DESTRUCTION UNIT, TREATMENT OF THE ORGANIC CONTAMINANTS IN SOIL

WITH STABILIZATION/SOLIDIFICATION REAGENTS, AND THEN BACKFILLING EXCAVATED AREAS WITH THE TREATED SOIL. ORGANIC CONTAMINANTS WOULD BE DESTROYED, AND METALS WOULD BE STABILIZED SO THEY WILL NOT MIGRATE.

APPROXIMATELY 11,300 CUBIC YARDS OF CONTAMINATED SOIL WOULD BE EXCAVATED ON THE SITE FROM THE AREAS SHOWN IN FIGURE 4. THE OIL-STAINED AREA WOULD BE EXCAVATED TO A DEPTH OF ABOUT 5 FEET, WHILE THE ADDITIONAL AREAS WOULD BE EXCAVATED TO A DEPTH OF ABOUT 1 FOOT. FIELD ANALYSES OR A LOCAL LAB WOULD BE UTILIZED DURING EXCAVATION TO DETERMINE ACTUAL DEPTHS SO THAT ALL SOILS CONTAMINATED ABOVE THE CLEAN-UP GOALS WOULD BE REMOVED.

THE RECOMMENDED ALTERNATIVE FOR GROUNDWATER REMEDIATION INCLUDES GROUNDWATER EXTRACTION THROUGH THE USE OF ON-SITE WELLS; THUS THE SOILS WOULD BE DEWATERED PRIOR TO EXCAVATION.

A MOBILE THERMAL DESTRUCTION UNIT WOULD BE USED TO DESTROY ORGANICS IN THE EXCAVATED SOILS. FOLLOWING THERMAL TREATMENT, THE SOILS WOULD BE TREATED BY A STABILIZATION SOLIDIFICATION (S/S) PROCESS WHICH WOULD REDUCE THE MOBILITY AND SOLUBILITY OF THE METALS IN THE SOILS. THE S/S PROCESS INVOLVES THE USE OF CHEMICAL REAGENTS WHICH REACT WITH THE METAL IONS TO FORM A CHEMICALLY AND MECHANICALLY STABLE SOLID.

THE TREATED SOIL WOULD BE PLACED BACK INTO THE EXCAVATED AREAS, AND THE SITE COVERED WITH GRAVEL TO ALLOW PRESENT USE OF THE SITE TO CONTINUE. THIS ALTERNATIVE IS A PERMANENT REMEDY WHICH WOULD DESTROY OR REDUCE THE MOBILITY OF ALL HAZARDOUS MATERIALS IN THE SOILS ON THE SITE. NO RISK OF HUMAN OR ENVIRONMENTAL CONTACT WOULD EXIST AFTER REMEDIATION, AND THE THREAT OF GROUNDWATER BEING CONTAMINATED BY THE SOURCE MATERIAL WOULD BE GREATLY REDUCED OR ELIMINATED. THIS ALTERNATIVE WOULD NOT REQUIRE LONG-TERM MAINTENANCE. FOR THESE REASONS, THIS ALTERNATIVE IS THE RECOMMENDED REMEDY FOR SOIL CONTAMINATION AT THE GEIGER (C&M OIL) SITE.

THE PRELIMINARY SOIL CLEANUP GOALS GIVEN IN TABLE 4 WILL BE SUBJECT TO REFINEMENT DURING REMEDIAL DESIGN AS ADDITIONAL DATA CONCERNING DEGRADATION, ATTENUATION, AND MIGRATION OF CONTAMINANTS IS DEVELOPED. THE FINAL CLEANUP GOALS WILL BE SUCH THAT CONTAMINANT LEVELS REMAINING IN THE SOIL FOLLOWING TREATMENT WILL NOT RAISE CONTAMINANT LEVELS IN THE GROUNDWATER ABOVE THE CLEANUP GOALS ESTABLISHED IN SECTION 4.

ALTERNATIVE B-6: EXCAVATION AND OFF-SITE DISPOSAL

WITH THIS ALTERNATIVE, ALL CONTAMINATED SOIL ON THE SITE WOULD BE EXCAVATED AND DISPOSED OF AT AN OFF-SITE RCRA-APPROVED HAZARDOUS WASTE LANDFILL. APPROXIMATELY 11,300 CUBIC YARDS OF SOIL WOULD BE EXCAVATED FROM THE AREAS SHOWN IN FIGURE 4. THE OIL-STAINED AREA WOULD BE EXCAVATED TO A DEPTH OF APPROXIMATELY 5 FEET, WITH ADDITIONAL AREAS

BEING EXCAVATED TO ABOUT ONE FOOT. ACTUAL DEPTHS WOULD BE DETERMINED BY USE OF A LOCAL OR MOBILE LAB DURING EXCAVATION TO ASSURE THAT ALL CONTAMINATED SOIL ABOVE CLEANUP GOALS IS REMOVED. DEWATERING WOULD BE

ACCOMPLISHED BY USE OF THE RECOMMENDED GROUNDWATER ALTERNATIVE, WHICH INCLUDES PUMPING FROM ON-SITE WELLS. EXCAVATED SOIL WOULD BE CARRIED TO AN APPROVED HAZARDOUS WASTE LANDFILL. THE NEAREST APPROVED LANDFILL WHICH HAS BEEN IDENTIFIED IS GSX LOCATED AT PINEWOOD, SOUTH CAROLINA. THIS LOCATION IS APPROXIMATELY 90 MILES FROM THE SITE.

THIS ALTERNATIVE WOULD RESULT IN THE PREVENTION OF HUMAN AND ENVIRONMENTAL CONTACT WITH CONTAMINATED SOIL AT THE SITE. HOWEVER, THIS IS NOT A PERMANENT REMEDY, IN THAT CONTAMINATED SOIL WOULD BE TRANSFERRED FROM ONE LOCATION TO ANOTHER. UNDER SECTION 121 OF SARA, THIS WILL BE THE LEAST-PREFERRED REMEDY WHEN A PERMANENT REMEDY IS FEASIBLE. BECAUSE A VIABLE PERMANENT REMEDY IS AVAILABLE, THIS ALTERNATIVE IS ELIMINATED FROM CONSIDERATION.

NO-ACTION ALTERNATIVE

UNDER THE NO-ACTION ALTERNATIVE, GROUNDWATER AND SOIL WOULD NOT BE REMEDIATED. MONITORING IS AN OPTION WHICH MAY OR MAY NOT BE IMPLEMENTED. THIS ALTERNATIVE IS PRESENTED TO PROVIDE A BASE-LEVEL ACTION, AGAINST WHICH OTHER ALTERNATIVES MAY BE COMPARED.

THIS NO-ACTION ALTERNATIVE WOULD NOT BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. CONTAMINATED GROUNDWATER COULD EVENTUALLY MIGRATE TO RESIDENTIAL WELLS DOWNGRADIENT OF THE SITE, AND COULD DISCHARGE INTO THE WALLACE RIVER WETLANDS, WHICH ARE INHABITED BY ENDANGERED SPECIES.

THE NO-ACTION ALTERNATIVE IS REJECTED FOR THESE REASONS, AND BECAUSE IT WOULD NOT COMPLY WITH SARA REQUIREMENTS TO REDUCE THE VOLUME, MOBILITY, OR TOXICITY OF HAZARDOUS SUBSTANCES WHEN TREATMENT TO ACCOMPLISH THIS IS FEASIBLE.

#RA

6.0 RECOMMENDED ALTERNATIVES

6.1 DESCRIPTION OF RECOMMENDED REMEDY

THE RECOMMENDED ALTERNATIVES FOR REMEDIATION OF GROUNDWATER AND SOIL CONTAMINATION AT THE GEIGER (C&M OIL) SITE INCLUDE EXTRACTION, TREATMENT, AND DISCHARGE OF GROUNDWATER; AND EXCAVATION, ON-SITE THERMAL TREATMENT, STABILIZATION/SOLIDIFICATION, AND BACKFILLING OF CONTAMINATED SOILS ON THE SITE.

TREATABILITY STUDIES WILL BE PERFORMED TO DETERMINE THE GROUNDWATER TREATMENT SYSTEM OR SYSTEMS WHICH WILL BE USED. THE SYSTEM(S) MAY INCLUDE AIR STRIPPING, CARBON ADSORPTION, FLOCCULATION/SEDIMENTATION OR OTHER APPROPRIATE GROUNDWATER TREATMENT TECHNOLOGIES. ALL OR ANY

COMBINATION OF THESE MAY BE INCLUDED TO ASSURE THAT THE INDICATOR CHEMICALS ARE REDUCED TO CONCENTRATIONS AT OR BELOW THE CLEAN-UP GOALS SPECIFIED IN TABLE 3. THE TREATMENT SYSTEM(S) WILL ALSO BE SELECTED AND

DESIGNED TO ASSURE THAT CONCENTRATIONS OF CONTAMINANTS NOT INCLUDED AS INDICATOR CHEMICALS ARE REDUCED IN THE SAME PROPORTION AS THE INDICATOR CHEMICAL CONCENTRATIONS.

CONTAMINATED SOIL WILL BE TREATED BY USE OF AN ONSITE THERMAL DESTRUCTION UNIT TO DESTROY ORGANIC COMPOUNDS IN THE SOIL. ALL SOIL CONTAINING INDICATOR ORGANIC CHEMICALS AT LEVELS ABOVE THE CLEANUP GOALS WILL BE EXCAVATED AND THERMALLY TREATED. WHERE INDICATOR METALS ARE ABOVE THE CLEANUP GOALS FOLLOWING TREATMENT, THE SOIL WILL ALSO UNDER GO STABILIZATION/SOLIDIFICATION. FOLLOWING TREATMENT, THE SOIL WILL BE PLACED BACK INTO THE EXCAVATION AND GRADED. AT SELECTED INTERVALS DURING EXCAVATION, SOIL SAMPLES WILL BE TAKEN AND WILL BE ANALYZED BY A LOCAL OR MOBILE LAB TO DETERMINE THE LIMITS OF EXCAVATIONS. IT SHOULD BE NOTED THAT THE ACTION LEVELS IN TABLE 4 ARE PRELIMINARY GOALS AND ARE SUBJECT TO REFINEMENT DURING REMEDIAL DESIGN.

BEFORE THERMAL TREATMENT IS IMPLEMENTED, SOLIDIFICATION/STABILIZATION WILL BE EVALUATED TO DETERMINE ITS EFFECTIVENESS IN ACHIEVING THE REMEDIAL ACTION GOALS.

THESE RECOMMENDED ALTERNATIVES MEET THE REQUIREMENTS OF THE NATIONAL OIL AND HAZARDOUS SUBSTANCES CONTINGENCY PLAN (NCP), 40 CFR 300.68 (J), AND THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA). THIS REMEDY PERMANENTLY AND SIGNIFICANTLY REDUCES THE VOLUME OF HAZARDOUS SUBSTANCES IN THE GROUNDWATER, AND REDUCES THE VOLUME AND/OR MOBILITY OF CONTAMINANTS IN THE SOIL. NO LONG-TERM MAINTENANCE WILL BE REQUIRED FOR THIS REMEDY.

THESE ALTERNATIVES ARE COST-EFFECTIVE WHEN COMPARED WITH OTHER APPLICABLE ALTERNATIVES. ALTERNATIVE A-3 HAS A HIGH RISK OF SPREADING CONTAMINATION; A-4 DOES NOT REMOVE SOURCE MATERIAL AND HAS AN ESTIMATED EFFECTIVE LIFE OF ONLY 30 YEARS. ALTERNATIVES B-1, B-2, B-3, AND B-4 WOULD LEAVE SOURCE MATERIAL ON-SITE, IN CONTACT WITH THE GROUNDWATER; B-6 WOULD REMOVE CONTAMINATED SOIL FROM THE SITE, BUT WOULD LANDFILL IT OFF-SITE. ALTERNATIVE B-5 IS CONSIDERED COST-EFFECTIVE BECAUSE IT WOULD BE A PERMANENT REMEDY, PROVIDING THE GREATEST PROTECTION TO HUMAN HEALTH AND THE ENVIRONMENT.

#OM

6.2 OPERATION AND MAINTENANCE

THIS REMEDY WILL REQUIRE APPROXIMATELY 29 MONTHS FOR GROUNDWATER TREATMENT AND 19 MONTHS FOR SOIL REMEDIATION, FOLLOWING DESIGN AND CONTRACT AWARD. THE TOTAL IMPLEMENTATION TIME FOR THESE REMEDIES WILL BE APPROXIMATELY 3 YEARS. WHEN THE REMEDY IS COMPLETED, NO LONG TERM OPERATION AND MAINTENANCE (O&M) WILL BE REQUIRED.

LONG TERM GROUNDWATER MONITORING WILL BE REQUIRED TO ASSURE THE EFFECTIVENESS AND PERMANENCE OF THE SOIL AND GROUNDWATER REMEDIES.

MONITORING WELLS AND RESIDENTIAL WELLS ON AND OFF THE SITE WILL BE INCLUDED IN THE MONITORING PROGRAM. GROUNDWATER SAMPLING WILL BE CONDUCTED QUARTERLY FOR THE FIRST TWO YEARS, AND YEARLY AFTER THAT. THIRTY YEARS OF MONITORING WAS INCLUDED IN COST ESTIMATES, BUT THIS PERIOD MAY BE SIGNIFICANTLY LESS.

6.3 COST OF RECOMMENDED ALTERNATIVES

CAPITAL COST FOR GROUNDWATER REMEDIATION IS $392,000 TO $930,000, AND SYSTEM OPERATING COSTS ARE $1,334,000 TO $1,573,000. LONG-TERM OPERATION & MAINTENANCE (O&M) OF THIS REMEDY IS NOT REQUIRED, BUT GROUNDWATER MONITORING WILL BE NECESSARY TO ASSURE THE PERMANENCE OF THIS REMEDY. THE PRESENT WORTH COST OF MONITORING WAS CALCULATED TO BE $367,200 BASED ON THIRTY YEARS OF ANNUAL MONITORING. THE ACTUAL MONITORING PERIOD MAY BE LESS IF NO UNACCEPTABLE CONTAMINATION LEVELS ARE DETECTED DURING THE INITIAL YEARS FOLLOWING SITE REMEDIATION. THE TOTAL PRESENT WORTH COST OF THIS ALTERNATIVE IS $1,736,000 TO $2,503,000.

CAPITAL COST FOR SOIL REMEDIATION IS $5,191,000 INCLUDING ACTUAL SYSTEM OPERATION. NO LONG-TERM OPERATION AND MAINTENANCE WILL BE REQUIRED FOLLOWING SITE REMEDIATION. LONG-TERM GROUNDWATER MONITORING WILL BE REQUIRED TO ASSURE THAT THIS REMEDY IS PERMANENT. MONITORING COSTS ARE GIVEN WITH THE GROUNDWATER COSTS, AND WILL NOT BE DUPLICATED FOR SOIL TREATMENT.

THE TOTAL PRESENT WORTH COST OF THIS REMEDY, INCLUDING BOTH SOIL AND GROUNDWATER REMEDIATION AND LONG-TERM MONITORING, IS $6,917,000 TO $7,693,400.

COST-SHARING RESPONSIBILITIES OF THE STATE OF SOUTH CAROLINA ARE DISCUSSED IN SECTION 8.0.

#SCH
6.4 SCHEDULE

THE PLANNED SCHEDULE FOR REMEDIAL ACTIVITIES AT THE GEIGER (C&M OIL) SITE IS AS FOLLOWS:

MAY	1987	APPROVE RECORD OF DECISION
OCTOBER	1987	BEGIN REMEDIAL DESIGN
JULY	1988	COMPLETE REMEDIAL DESIGN AND BEGIN MOBILIZATION
JANUARY	1989	COMPLETE MOBILIZATION, EQUIPMENT INSTALLATION, AND TESTING
JULY	1991	COMPLETE REMEDIAL ACTIVITIES.

#FA
6.5 FUTURE ACTIONS

FOLLOWING COMPLETION OF REMEDIAL ACTIVITIES, NO FURTHER ACTION WILL NEED TO BE PERFORMED TO MAINTAIN THIS REMEDY. THE RECOMMENDED ALTERNATIVES ARE A PERMANENT REMEDY AND WILL REQUIRE NO LONG TERM OPERATION OR MAINTENANCE. LONG TERM GROUNDWATER MONITORING WILL BE REQUIRED TO ASSURE THE EFFECTIVENESS OF THIS REMEDY.

#OEL

6.6 CONSISTENCY WITH OTHER ENVIRONMENTAL LAWS

REMEDIAL ACTIONS PERFORMED UNDER CERCLA MUST COMPLY WITH ALL APPLICABLE FEDERAL AND STATE REGULATIONS. ALL ALTERNATIVES CONSIDERED FOR THE GEIGER (C&M OIL) SITE WERE EVALUATED ON THE BASIS OF THE DEGREE TO WHICH THEY COMPLIED WITH THESE REGULATIONS. THE RECOMMENDED ALTERNATIVES WERE FOUND TO MEET OR EXCEED ALL APPLICABLE ENVIRONMENTAL LAWS, AS DISCUSSED BELOW.

- RESOURCE CONSERVATION AND RECOVERY ACT

THE RECOMMENDED REMEDY FOR SOIL CONTAMINATION INCLUDES INCINERATION, WHICH IS REGULATED UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA). INCINERATION WILL BE CONDUCTED ENTIRELY ONSITE AND IS THEREFORE EXEMPT FROM ALL FEDERAL, STATE, AND LOCAL PERMITTING REQUIREMENTS, AS SPECIFIED IN SARA, SECTION 121(E)(1). HOWEVER, ALL SUBSTANTIVE REGULATIONS GOVERNING INCINERATION WILL BE COMPLIED WITH, EVEN THOUGH A FORMAL PERMIT IS NOT REQUIRED.

- CLEAN WATER ACT

CONTAMINANTS HAVE BEEN DETECTED IN A MARSHY AREA NEAR THE SITE, BUT ADVERSE ENVIRONMENTAL IMPACTS ASSOCIATED WITH REMEDIATING THESE AREAS WOULD BE GREATER THAN ANY BENEFITS WHICH MIGHT BE OBTAINED. SOIL REMEDIATION IS AIMED AT SOURCE CONTROL, AND IMPLEMENTATION OF THE RECOMMENDED ALTERNATIVE WOULD RESULT IN AN END TO FURTHER CONTAMINATION OF SURFACE WATER.

- FLOODPLAIN MANAGEMENT EXECUTIVE ORDER 11988

THIS SITE DOES NOT LIE WITHIN A FLOODPLAIN AND THUS IS NOT SUBJECT TO THE REQUIREMENTS OF E.O. 11988.

- DEPARTMENT OF TRANSPORTATION

TRANSPORT OF HAZARDOUS SUBSTANCES IS REGULATED BY THE DEPARTMENT OF TRANSPORTATION (DOT). IF RESIDUAL MATERIAL RESULTS FROM THE GROUNDWATER TREATMENT SYSTEM, IT WILL BE SHIPPED TO AN OFF-SITE DISPOSAL FACILITY.

IF TESTS ON THE MATERIAL INDICATE THE NEED FOR DISPOSAL IN A HAZARDOUS WASTE FACILITY, DOT REGULATIONS GOVERNING ITS SHIPMENT WILL BE FOLLOWED.

- OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

A HEALTH AND SAFETY PLAN WILL BE DEVELOPED DURING REMEDIAL DESIGN AND WILL BE FOLLOWED DURING FIELD ACTIVITIES TO ASSURE THAT REGULATIONS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) ARE FOLLOWED.

- SAFE DRINKING WATER ACT

MAXIMUM CONTAMINANT LEVELS (MCLS) ESTABLISHED UNDER THE SAFE DRINKING WATER ACT WERE FOUND TO BE RELEVANT AND APPROPRIATE TO REMEDIAL ACTION AT THE GEIGER SITE. THE CLEANUP GOALS FOR GROUNDWATER ESTABLISHED IN SECTION 4 USE MCLS OR PROPOSED MCLS AS THE GOAL WHEN AN MCL OR PMCL HAS BEEN SET, UNLESS A MORE STRINGENT CRITERIA RESULTS IN THE USE OF A LOWER CONCENTRATION LIMIT.

- NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

DISCHARGE OF TREATED GROUNDWATER IS PART OF THE RECOMMENDED REMEDIAL ALTERNATIVE. THIS DISCHARGE WILL MEET EFFLUENT LIMIT REQUIREMENTS OF THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES). AQUATIC LIFE CHRONIC TOXICITY VALUES, WHICH ARE USED IN THE NPDES PERMITTING SYSTEM, WERE USED IN DETERMINING THE GROUNDWATER CLEANUP GOALS IN SECTION 4, UNLESS A MORE STRINGENT CRITERIA WAS USED TO SET A LOWER CONCENTRATION. BENCH-SCALE OR PILOT TESTS, INCLUDING BIOASSAYS, WILL BE CONDUCTED WHERE APPROPRIATE DURING DESIGN OF THIS ALTERNATIVE TO SET EFFLUENT LIMITS, AND TO OPTIMIZE THE GROUNDWATER TREATMENT SYSTEM SO THAT THESE EFFLUENT LIMITS ARE MET.

- ENDANGERED SPECIES ACT

THE RECOMMENDED REMEDIAL ALTERNATIVE IS PROTECTIVE OF SPECIES LISTED AS ENDANGERED OR THREATENED UNDER THE ENDANGERED SPECIES ACT. REQUIREMENTS OF THE INTERAGENCY SECTION 7 CONSULTATION PROCESS, 50CFR, PART 402, WILL BE MET. THE DEPARTMENT OF INTERIOR, FISH AND WILDLIFE SERVICE, WILL BE CONSULTED DURING REMEDIAL DESIGN TO ASSURE THAT ENDANGERED OR THREATENED SPECIES ARE NOT ADVERSELY IMPACTED BY IMPLEMENTATION OF THIS REMEDY.

- AMBIENT AIR QUALITY STANDARDS

THE INCINERATION AND GROUNDWATER TREATMENT SYSTEMS WILL BE DESIGNED AND MONITORED TO ASSURE THAT AIR EMISSIONS MEET ALL STATE AND FEDERAL STANDARDS.

- STATE DRINKING WATER STANDARDS

MAXIMUM CONTAMINANT LEVELS ESTABLISHED BY STATE OF SOUTH CAROLINA REGULATIONS ARE ADOPTED FROM THOSE OF THE FEDERAL SAFE DRINKING WATER

ACT, AND WILL BE MET AS DISCUSSED ABOVE.

#CR

7.0 COMMUNITY RELATIONS

A PUBLIC MEETING WAS HELD ON JANUARY 29, 1987, AT THE HOLLYWOOD TOWN HALL TO DISCUSS THE REMEDIAL ALTERNATIVES DEVELOPED IN THE FEASIBILITY STUDY. EPA DID NOT INDICATE A PREFERENCE FOR A PARTICULAR ALTERNATIVE. COMMENTS FROM THE PUBLIC DID NOT FAVOR ANY PARTICULAR ALTERNATIVES, AND NONE OF THE ALTERNATIVES WERE OPPOSED BY ANYONE. NO COMMENTS IN REGARD TO ANY OF THE ALTERNATIVES WERE RECEIVED DURING THE THREE-WEEK PUBLIC COMMENT PERIOD WHICH ENDED FEBRUARY 19, 1987.

THE PUBLIC DID SHOW A DESIRE FOR REMEDIATION OF THE SITE, AND SEEMED TO FAVOR REMOVAL OR DESTRUCTION OF CONTAMINATION FOUND IN THE SOIL AND GROUNDWATER. NO OPPOSITION FROM THE PUBLIC IS EXPECTED IF THE RECOMMENDED REMEDIAL ALTERNATIVE IS IMPLEMENTED.

A RESPONSIVENESS SUMMARY HAS BEEN PREPARED TO SUMMARIZE COMMUNITY CONCERNS AND EPA'S COMMUNITY RELATIONS ACTIVITIES.

8.0 STATE INVOLVEMENT

AS REQUIRED BY CERCLA, SECTION 104(C), THE STATE MUST ASSURE PAYMENT OF TEN PERCENT OF ALL COSTS OF REMEDIAL ACTION. REMEDIAL ACTION HAS BEEN DEFINED IN SARA AS INCLUDING ALL CONSTRUCTION AND IMPLEMENTATION ACTIVITIES UNTIL SITE REMEDIATION IS COMPLETED. ACTIVITIES REQUIRED TO MAINTAIN THE EFFECTIVENESS OF THE REMEDY FOLLOWING COMPLETION OF THE REMEDIAL ACTION IS CONSIDERED OPERATION AND MAINTENANCE (O&M). IF SURFACE WATER OR GROUNDWATER TREATMENT IS PART OF THE REMEDY, ONLY THE FIRST TEN YEARS OF SUCH TREATMENT WILL BE CONSIDERED AS REMEDIAL ACTION; THE REMAINING PERIOD OF TREATMENT WILL BE A PART OF O&M ACTIVITIES. THE STATE IS REQUIRED TO PAY 100 PERCENT OF ALL O&M FOLLOWING COMPLETION OF THE REMEDIAL ACTION. EPA AND THE STATE MAY ENTER INTO AN AGREEMENT WHEREBY EPA WOULD FUND 90% OF O&M COSTS, FOR A PERIOD NOT TO EXCEED ONE YEAR, UNTIL THE REMEDY IS DETERMINED TO BE OPERATIONAL AND FUNCTIONAL.

A SUMMARY OF STATE COST-SHARING OBLIGATIONS FOR THE RECOMMENDED ALTERNATIVE AT THE GEIGER (C&M OIL) SITE IS SHOWN IN TABLE 7. THE STATE OF SOUTH CAROLINA'S COST-SHARING RESPONSIBILITY WOULD BE IN THE RANGE OF $809,600 TO $876,600.

THE STATE OF SOUTH CAROLINA HAS BEEN CONSULTED ON THE SELECTION OF THIS REMEDY. THE STATE HAS CONCURRED, BUT HAS POINTED OUT THAT THEIR FUNDS FOR COST-SHARING ARE LIMITED. ALTHOUGH THE STATE PRESENTLY HAS FUNDING TO COVER THEIR SHARE OF THIS REMEDIAL ACTION, THEY ARE CONCERNED ABOUT FUNDING PROBLEMS ON FUTURE REMEDIAL ACTIONS AT OTHER NPL SITES IN THE STATE. THE STATE'S LETTER OF CONCURRENCE MAY BE FOUND IN APPENDIX B.

#TMA

TABLES, MEMORANDA, ATTACHMENTS

APPENDIX A
U.S. FISH AND WILDLIFE SERVICE
CORRESPONDENCE

UNITED STATES DEPARTMENT OF THE INTERIOR

JANUARY 21, 1987

IN REPLY REFER TO
LOG NO. 4-2-87-105

MR. THOMAS M. ROTH
REMEDIAL PROJECT MANAGER
EMERGENCY AND REMEDIAL RESPONSE BRANCH
ENVIRONMENTAL PROTECTION AGENCY
345 COURTLAND STREET
ATLANTA, GA 30365

DEAR MR. ROTH:

YOUR JANUARY 14, 1987, LETTER REGARDING GEIGER (C & M OIL) HAZARDOUS WASTE SITE IN CHARLESTON COUNTY, SOUTH CAROLINA, WAS RECEIVED JANUARY 20, 1987. WE HAVE REVIEWED THE PROJECT AS REQUESTED WITH REGARD TO ENDANGERED AND THREATENED SPECIES.

THE ATTACHED PAGE LISTS THE FEDERALLY LISTED ENDANGERED (E) AND/OR THREATENED (T) AND/OR SPECIES PROPOSED FOR LISTING AS ENDANGERED (PE) OR THREATENED (PT) WHICH MAY OCCUR IN THE AREA OF INFLUENCE OF THIS ACTION.

THE LEGAL RESPONSIBILITIES OF A FEDERAL AGENCY UNDER SECTION 7 OF THE ACT ARE DETAILED IN THE ENCLOSED MATERIAL. PLEASE RETAIN THIS INFORMATION IN YOUR FILES FOR USE IN FUTURE SECTION 7 CONSULTATIONS. IF YOU HAVE QUESTIONS, PLEASE CONTACT US AT (704) 259-0321 (FTS 672-0321).

YOUR CONCERN FOR ENDANGERED SPECIES IS APPRECIATED, AND WE LOOK FORWARD TO WORKING WITH YOU ON ENDANGERED SPECIES MATTERS IN THE FUTURE.

SINCERELY YOURS,

V. GARY HENRY
ACTING FIELD SUPERVISOR

CC:
MR. JOHN E. CELY, COORDINATOR, NONGAME AND ENDANGERED SPECIES, SOUTH

CAROLINA WILDLIFE AND MARINE RESOURCES DEPARTMENT, COLUMBIA, SC 29202
FIELD SUPERVISOR, ES, FWS, CHARLESTON, SC.

UNITED STATES DEPARTMENT OF THE INTERIOR

IN REPLY REFER TO
LOG NO. 4-2-87-105

LISTED SPECIES

BIRDS

BALD EAGLE - HALIAEETUS LEUCOCEPHALUS (E)
WOOD STORK - MYCTERIA AMERICANA (E)
RED-COCKADED WOODPECKER - PICOIDES BOREALIS (E)

REPTILES

AMERICAN ALLIGATOR - ALLIGATOR MISSISSIPPIENSIS (T)

STATUS REVIEW SPECIES
"STATUS REVIEW" (SR) SPECIES ARE NOT LEGALLY PROTECTED UNDER THE ENDANGERED SPECIES ACT, AND ARE NOT SUBJECT TO ANY OF ITS PROVISIONS, INCLUDING SECTION 7, UNTIL THEY ARE FORMALLY PROPOSED OR LISTED AS ENDANGERED/THREATENED. WE ARE INCLUDING THESE SPECIES IN OUR RESPONSE FOR THE PURPOSE OF GIVING YOU ADVANCE NOTIFICATION. THESE SPECIES MAY BE LISTED IN THE FUTURE, AT WHICH TIME THEY WILL BE PROTECTED UNDER THE ENDANGERED SPECIES ACT. IN THE MEANTIME, WE WOULD APPRECIATE ANYTHING YOU MIGHT DO TO AVOID IMPACTING THEM.

PLANTS

INCISED GROOVEBUR - AGRIMONIA INCISA
CYPRESS KNEE SEDGE - CAREX DECOMPOSITA
CHAFF-SEED - SCHWALBEA AMERICANA

AMPHIBIANS

FLATWOODS SALAMANDER - AMBYSTOMA CINGULATUM

BIRDS

AMERICAN SWALLOW-TAILED KITE - ELANOIDES FORFICATUS FORFICATUS
BACHMAN'S SPARROW - AIMOPHILA AESTIVALIS.

APPENDIX B
STATE OF SOUTH CAROLINA
CORRESPONDENCE

SOUTH CAROLINA DEPARTMENT OF HEALTH
AND ENVIRONMENTAL CONTROL

FEBRUARY 23, 1987

MR. TOM ROTH
US EPA, REGION IV
345 COURTLAND STREET, NE
ATLANTA, GEORGIA 30365

RE: GEIGER (C & M OIL) SITE
CHARLESTON COUNTY

DEAR MR. ROTH:

AS REQUESTED, THE DEPARTMENT HAS REVIEWED THE DRAFT RECORD OF DECISION (ROD) DATED FEBRUARY 9, 1987, THE FOLLOWING COMMENTS AND QUESTIONS WERE DEVELOPED AND OUTLINED FOR YOUR REVIEW:

1. (SECTION 1.2, PAGE 5, THIRD COMPLETE PARAGRAPH)
   THE WASTE OIL WAS FOUND TO BE SIMILAR TO DEGREASING COMPOUNDS? THE SENTENCE REFERRING TO THIS SHOULD BE CLARIFIED.

2. FROM A COMMUNITY RELATIONS POINT OF VIEW, THE ADDITION OF A PARAGRAPH UNDER THE SITE HISTORY SECTION REGARDING THE INVESTIGATION OF BURIED DRUMS MAY HELP TO SUPPORT THE CONCLUSION THAT NO BURIED DRUMS WERE FOUND AT THE SITE.

3. (TABLE 1, PAGE 10)
   THE ADDITION OF UNITS ON THE BACKGROUND RANGE FOR METALS WOULD BE BENEFICIAL.

4. (SECTION 3.5, PAGE 11, TOP OF PAGE)
   IT APPEARS THAT PART OF THE SECOND SENTENCE WAS OMITTED DURING TYPING.

5. (SECTION 3.5, PAGE 15, SECOND PARAGRAPH)
   SHOULD THE FIRST SENTENCE INCLUDE INGESTING SURFACE WATER FROM THE ON-SITE PONDS AND THE DISCHARGE STREAM? HAS THE SURFACE WATER IN THESE AREAS SHOWN CONTAMINATION?

6. (SECTION 3.5, PAGE 15, THIRD PARAGRAPH)
   SAME GENERAL COMMENT AS IN #5 ABOVE.

7. (SECTION 4.1, PAGE 16, FOURTH PARAGRAPH)
   THE SECOND SENTENCE IMPLIES ONLY NINE WELLS IN THE TWO MILE RADIUS. IS THAT WHAT YOU INTENDED?

8. (SECTION 4.1, PAGE 16, FOURTH PARAGRAPH)
THE DRAFT ROD STATES THAT RCRA REGULATIONS REQUIRE CLEANUP FOR CERTAIN LISTED CONTAMINANTS. A LIST OF CONTAMINANTS IN THE GROUNDWATER AT GEIGER THAT WOULD BE COVERED BY RCRA SHOULD BE ADDED.

9. (TABLE 3, PAGE 17)
THE ADDITION OF UNITS ON THE MAXIMUM DETECTED COLUMN WOULD BE BENEFICIAL.

10. (SECTION 4.2, PAGE 19, FOURTH PARAGRAPH)
HOW CAN THE REMEDIAL ALTERNATIVE FOR THE SOIL BE DESIGNATED PRIOR TO KNOWING THE LEACHABILITY OF THE METALS OR ORGANICS. IT WOULD BE POSSIBLE THAT THE CONTAMINATION IS IN AN IMMOBILE STATE UNDER CURRENT SITE CONDITIONS. IT IS TRUE THAT THE GROUNDWATER HAS BEEN OBTAINED ON CURRENT LEACHING OF THE SOIL CONTAMINATION.

11. (SECTION 4.3, PAGE 20, FIRST PARAGRAPH)
THE DEPARTMENT IS NOT SURE THAT THE SURFACE WATER MIGRATION ROUTE IS CURRENTLY IMPACTING THE SWAMP. IT IS LIKELY THAT WHEN THE OIL LAGOONS WERE OPERATING SURFACE WATER CONTAMINATION COULD HAVE BEEN A PROBLEM.

12. (SECTION 5.2, PAGE 30, FIRST PARAGRAPH)
STABLEX OF SOUTH CAROLINA IS NOT A PERMITTED RCRA LANDFILL. GSX CORPORATION HAS A PERMITTED RCRA LANDFILL NEAR SUMTER, SOUTH CAROLINA WHICH IS APPROXIMATELY NINETY (90) MILES FROM THE GEIGER SITE.

13. (SECTION #6, PAGE 31, SECOND PARAGRAPH)
IF THE REMEDIAL ALTERNATIVE FOR SOIL AND GROUNDWATER WERE IMPLEMENTED AND SUCCESSFULLY COMPLIED WITH ALL CLEANUP GOALS, WHY WOULD LONG-TERM GROUNDWATER MONITORING BE NECESSARY? AT THE COMPLETION OF THE REMEDIATION, THE SOURCE AND THE RESULTING GROUNDWATER CONTAMINATION WOULD HAVE BEEN COMPLETELY TREATED.

THE STATE IS STILL REVIEWING THE EPA RECOMMENDED REMEDIAL ALTERNATIVES. A FINAL DECISION ON CONCURRENCE AND NONCONCURRENCE WILL NOT BE AVAILABLE UNTIL DHEC HAS REVIEWED ALL THE PERTINENT DATA. A RESPONSE ON ITEMS 5, 10, 11, AND 13 ABOVE AND A STATEMENT ON THE EPA POLICY REGARDING THE STATE'S COST SHARING RESPONSIBILITIES ON THE REMEDIAL DESIGN PHASE, REMEDIAL ACTION PHASE AND LONG-TERM MONITORING WOULD GREATLY ASSIST THE STATE IN MAKING A FINAL DECISION.

IF YOU HAVE ANY QUESTIONS, PLEASE DO NOT HESITATE TO CALL.

SINCERELY,

CHRIS D. STATON
REMEDIAL RESPONSE SECTION
BUREAU OF SOLID AND HAZARDOUS WASTE
MANAGEMENT

CDS:ELF

CC: KEN TAYLOR
WAYNE FANNING
RON KINNEY.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV

REF: 4WD-ER

MARCH 6, 1987

CHRIS STATON
SOUTH CAROLINA DEPARTMENT OF
HEALTH AND ENVIRONMENTAL CONTROL
2600 BULL STREET
COLUMBIA, S.C. 29201

DEAR MR. STATON:

THIS IS IN RESPONSE TO YOUR FEBRUARY 23, 1987, COMMENTS ON THE DRAFT RECORD OF DECISION (ROD) FOR THE GEIGER (C&M OIL) SITE. AS REQUESTED, I AM RESPONDING TO ITEMS 5, 10, 11, AND 13 OF YOUR PREVIOUS LETTER.

REPLY TO COMMENT 5: ENVIRONMENTAL RECEPTORS DO INCLUDE AQUATIC LIFE INGESTING SURFACE WATER IN THE ONSITE PONDS AND THE DISCHARGE STREAM. SURFACE WATER IN THESE AREAS CONTAINS ELEVATED LEVELS OF SOME CONTAMINANTS, BUT THE CONCENTRATIONS ARE NOT GREAT ENOUGH TO WARRANT REMEDIATION. THE PURPOSE OF SECTION 3.5 OF THE ROD IS TO IDENTIFY RECEPTORS AND POTENTIAL RECEPTORS OF SITE CONTAMINANTS; NO ATTEMPT IS MADE IN THIS SECTION TO EVALUATE HEALTH OR ENVIRONMENTAL RISKS POSED TO THESE RECEPTORS.

REPLY TO COMMENT 10: THE NEED FOR SOIL REMEDIATION WAS EVALUATED BASED UPON THE HUMAN HEALTH RISK POSED BY THE CONTAMINATED SOIL. THE PUBLIC HEALTH EVALUATION CALCULATED RISKS POSED TO ADULTS AND CHILDREN FROM EXPOSURE TO INDICATOR CHEMICALS THROUGH THE SOIL. UNDER A FUTURE USE SCENARIO, WHERE THE SITE WOULD BE DEVELOPED, A LIFETIME CANCER RISK OF

2.1 X 10-5 IS POSED TO ADULT RESIDENTS, AND A LIFETIME RISK OF 2.2 X 10-4 IS POSED TO CHILD RESIDENTS. THESE RISKS ARE ABOVE THE ACCEPTABLE 10-6 RISK LEVEL; THUS, IT WAS DETERMINED THAT A NEED EXISTS FOR SOIL

REMEDIATION.

ALSO CONSIDERED WAS POSSIBLE LEACHING OF CONTAMINANTS FROM THE SOIL INTO THE GROUNDWATER. THE SOIL CONTAINS ELEVATED LEVELS OF METALS AND ORGANICS WHICH ARE EXPECTED TO LEACH INTO THE GROUNDWATER, RAISING GROUNDWATER CONTAMINANT LEVELS AFTER GROUNDWATER REMEDIATION HAS BEEN COMPLETED. NO MODELING HAS BEEN PERFORMED TO DETERMINE THE MAGNITUDE OF FUTURE LEACHING, BUT WILL BE INCLUDED AS PART OF THE REMEDIAL DESIGN. THE RECOMMENDED ALTERNATIVE WAS SELECTED BECAUSE IT WILL ACHIEVE THE DESIRED CLEANUP RESULT OF ELIMINATING HUMAN HEALTH RISKS FROM EXPOSURE TO SOIL CONTAMINANTS, AND WILL ELIMINATE POSSIBLE LEACHING INTO THE GROUNDWATER. THE ALTERNATIVE WAS ALSO SELECTED BECAUSE IT COMPLIES WITH THE REQUIREMENTS OF SECTION 121 OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA), WHICH SPECIFIES THAT REMEDIES UTILIZING TREATMENT TO REDUCE THE VOLUME, MOBILITY, OR TOXICITY OF HAZARDOUS SUBSTANCES WILL BE PREFERRED OVER THOSE WHICH DO NOT UTILIZE SUCH TREATMENT. NO OTHER ALTERNATIVES FOR SOIL REMEDIATION EXAMINED IN THE FEASIBILITY STUDY MEET THOSE REQUIREMENTS.

RESPONSE TO COMMENT 11: SECTION 4.3 OF THE ROD HAS BEEN CHANGED TO REFLECT THE ASSUMPTION THAT MOST SURFACE RUN-OFF FROM THE CONTAMINATED SOILS IS CAPTURED BY THE ON-SITE PONDS AND IS NOT LIKELY TO IMPACT THE SWAMP.

RESPONSE TO COMMENT 13: LONG-TERM MONITORING WOULD BE REQUIRED TO ASSURE THAT THIS REMEDY IS EFFECTIVE AND PERMANENT. SOIL CLEANUP LEVELS WILL BE ESTABLISHED BASED UPON MODELING AND TESTING PERFORMED BEFORE REMEDIAL ACTION. MONITORING WILL CONFIRM THAT THESE CLEANUP GOALS WERE ADEQUATE AND THAT CONTAMINANTS LEFT IN THE SOIL ARE NOT DEGRADING THE GROUNDWATER. SHOULD SOLIDIFICATION/STABILIZATION BE USED, MONITORING WILL ALLOW US TO JUDGE THE EFFECTIVENESS AND PERMANENCE OF THE IMMOBILIZATION OF THE METALS. ALSO, THE EFFECTIVENESS OF THE GROUNDWATER EXTRACTION SYSTEM IN REMOVING CONTAMINATED GROUNDWATER CAN BE JUDGED BY MONITORING DATA.

THE PRESENT WORTH COST OF MONITORING WAS DEVELOPED IN THE FEASIBILITY STUDY ASSUMING THIRTY YEARS OF MONITORING. THIS PERIOD MAY BE SHORTENED SUBSTANTIALLY IF THE RESULTS OF EARLY MONITORING INDICATE ACCEPTABLE EFFECTIVENESS AND PERMANENCE OF THE REMEDY.

WE ARE REVIEWING OUR POLICY ON STATE COST-SHARING RESPONSIBILITIES, AND WILL DISCUSS THIS WITH YOU IN THE NEAR FUTURE. PLEASE CONTACT ME AT (404) 347-2643 IF YOU HAVE ANY QUESTIONS ON THIS REPLY TO YOUR COMMENTS.

SINCERELY,

THOMAS M. ROTH

REMEDIAL PROJECT MANAGER
EMERGENCY AND REMEDIAL RESPONSE BRANCH.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV

REF: 4WD-ER

RON KINNEY, ACTING DIRECTOR
DIVISION OF SITE ENGINEERING
AND RESPONSE ACTIVITIES
SOUTH CAROLINA DEPARTMENT OF
HEALTH & ENVIRONMENTAL CONTROL
2600 BULL STREET
COLUMBIA, SOUTH CAROLINA 29201

DEAR MR. KINNEY:

THIS LETTER IS IN RESPONSE TO YOUR DEPARTMENT'S RECENT REQUEST FOR CLARIFICATION OF STATE COST-SHARING RESPONSIBILITIES FOR REMEDIAL DESIGN AND REMEDIAL ACTION AT PRIVATELY-OWNED NPL SUPERFUND SITES.

AS REQUIRED BY CERCLA, SECTION 104(C), THE STATE MUST ASSURE PAYMENT OF TEN PERCENT OF ALL COSTS OF REMEDIAL ACTION. REMEDIAL ACTION HAS BEEN DEFINED IN SARA AS INCLUDING ALL CONSTRUCTION AND IMPLEMENTATION ACTIVITIES UNTIL SITE REMEDIATION IS COMPLETED. ACTIVITIES REQUIRED TO MAINTAIN THE EFFECTIVENESS OF THE REMEDY FOLLOWING COMPLETION OF THE REMEDIAL ACTION IS CONSIDERED OPERATION AND MAINTENANCE (O&M). IF SURFACE WATER OR GROUNDWATER TREATMENT IS PART OF THE REMEDY, ONLY THE FIRST TEN YEARS OF SUCH TREATMENT WILL BE CONSIDERED AS REMEDIAL ACTION; THE REMAINING PERIOD OF TREATMENT WILL BE A PART OF O&M ACTIVITIES. THE STATE IS REQUIRED TO PAY 100 PERCENT OF ALL O&M FOLLOWING COMPLETION OF THE REMEDIAL ACTION. EPA AND THE STATE MAY ENTER INTO AN AGREEMENT WHEREBY EPA WOULD FUND 90 PERCENT OF O&M COSTS, FOR A PERIOD NOT TO EXCEED ONE YEAR, DURING WHICH THE REMEDY IS DETERMINED TO BE OPERATIONAL AND FUNCTIONAL.

A SUMMARY OF STATE COST-SHARING OBLIGATIONS FOR THE RECOMMENDED ALTERNATIVE AT THE GEIGER (C&M OIL) SITE IS ENCLOSED. ALSO ENCLOSED IS THE FINAL DRAFT RECORD OF DECISION FOR THE GEIGER SITE. WE ARE REQUESTING CONCURRENCE BY THE STATE OF SOUTH CAROLINA ON THIS ROD, AND ASK THAT YOU SUBMIT A REPLY TO EPA AS SOON AS A DECISION ON CONCURRENCE IS MADE.

I HAVE REVIEWED YOUR LETTER OF SEPTEMBER 25, 1986, TO DENNIS MANGANIELLO REGARDING THE SCRDI-DIXIANA SITE. THERE APPEARS TO BE SOME CONFUSION ABOUT THE COST SHARE. WHILE THE LANGUAGE IN THE DIXIANA ROD MAY BE LIBERALLY INTERPRETED IT CAN IN NO WAY BE VIEWED AS A WAIVER OF SITE CONSTRUCTION COST. THE STATE MUST PAY 10 PERCENT OF ALL CONSTRUCTION

RELATED ACTIVITIES. IN ADDITION THE STATE IS RESPONSIBLE FOR 10 PERCENT OF O&M FOR THE FIRST YEAR AND 100 PERCENT THEREAFTER. THE DISCUSSION OF 100 PERCENT FEDERAL FUNDING ONLY REFERS TO REMEDIAL DESIGN COST.

PLEASE CONTACT ME AT (404) 347-2643 IF YOU HAVE ANY FURTHER QUESTIONS REGARDING THIS MATTER.

SINCERELY,

RUSSELL WRIGHT, CHIEF
REMEDIAL ACTION SECTION
EMERGENCY AND REMEDIAL RESPONSE BRANCH

ENCLOSURE.

SOUTH CAROLINA DEPARTMENT OF HEALTH
AND ENVIRONMENTAL CONTROL

MAY 6, 1987

MR. JACK RAVAN
REGIONAL ADMINISTRATOR
US EPA REGION IV
345 COURTLAND STREET
ATLANTA, GEORGIA 30365

RE: FINAL DRAFT RECORD OF DECISION (ROD)
GEIGER (C&M OIL) PROPERTY
CHARLESTON COUNTY, SOUTH CAROLINA

DEAR MR. RAVAN:

THE DEPARTMENT HAS REVIEWED THE FINAL DRAFT ROD RECEIVED ON MARCH 9, 1987. THE EPA RECOMMENDED ALTERNATIVES INCLUDE EXTRACTION, TREATMENT AND DISCHARGE FOR CONTAMINATED GROUNDWATER, AND EXCAVATION, ON-SITE INCINERATION, STABILIZATION/SOLIDIFICATION AND BACKFILLING FOR CONTAMINATED SOIL. THE DEPARTMENT, WITH RESERVATIONS, CONCURS WITH EPA'S FINAL DRAFT ROD AND SPECIFICALLY WITH THE SELECTED REMEDIAL ALTERNATIVES. AS REQUIRED BY CERCLA SECTION 104(C), THE STATE HEREBY ASSURES PAYMENT OF 10 PERCENT FOR REMEDIAL CONSTRUCTION AND IMPLEMENTATION OF THE SELECTED ALTERNATIVES. ALSO, THE STATE WILL PAY 10 PERCENT OF THE FIRST YEAR OF O&M AND THEREAFTER PAY 100 PERCENT OF O&M COSTS FOR A MAXIMUM OF 29 YEARS. SINCE THE DEPARTMENT IS CONCURRING WITH AN ON-SITE PERMANENT REMEDY, THE DEPARTMENT RETAINS THE RIGHT TO ADJUST THE GROUNDWATER SAMPLING FREQUENCY DURING THE THIRTY YEAR MONITORING PERIOD, IF EARLY MONITORING RESULTS INDICATE THAT THE PERMANENT REMEDY WAS EFFECTIVE.

THE DEPARTMENT HAS NUMEROUS RESERVATIONS ABOUT THIS CONCURRENCE.

THE STATE OF SOUTH CAROLINA HAS ESTABLISHED A HAZARDOUS WASTE CONTINGENCY FUND TO MEET THE STATE'S MATCH ON NPL SITES, AMONG OTHER GOALS. HOWEVER, FUND AVAILABILITY ON THE STATE LEVEL HAS NO EFFECT ON

THE EPA'S SELECTION ALTERNATIVE. IF THE STATE CANNOT CONCUR WITH THE EPA ALTERNATIVE THEN NO SUPERFUND REMEDIAL ACTION IS ALLOWED. FURTHERMORE, CERCLA SECTION 121 CALLS FOR EPA TO PREFER ON-SITE METHODS OF TREATMENT THAT PERMANENTLY REDUCES THE VOLUME, TOXICITY OR MOBILITY OF THE HAZARDOUS WASTE. HOWEVER OFF-SITE TREATMENT OF THE CONTAMINATED MATERIAL SHOULD NOT BE TOTALLY DISALLOWED AS AN ACCEPTABLE PERMANENT CORRECTIVE ACTION OPTION. FROM THE STATE'S PERSPECTIVE, THE ULTIMATE TRANSPORT AND DISPOSAL OF CONTAMINATED MATERIALS IN A RCRA APPROVED FACILITY MAY BE THE MOST COST EFFECTIVE ALTERNATIVE. THE GOAL OF REMOVAL OF THE CONTAMINATES FROM THE UNCONTROLLED SITE TO A CONTROLLED, MONITORED SITE IS MET IN THIS MANNER.

THE STATE REALIZES THE PRESSURE EPA IS UNDER TO SELECT ON-SITE PERMANENT REMEDIES BUT DUE TO THE STATE'S LIMITED FUNDS AND THE CURRENT STATUS OF TEN (10) FINAL AND FIVE (5) PROPOSED NPL SITES, THE STATE MUST BE CONCERNED ABOUT FUTURE CONCURRENCE WITH EPA SELECTED ALTERNATIVES.

SINCERELY,

R. LEWIS SHAW
DEPUTY COMMISSIONER
ENVIRONMENTAL QUALITY CONTROL

RLS/LMM

CC: CHRIS STATON
BOB KING
RON KINNEY
WAYNE FANNING
KEN TAYLOR.

APPENDIX C
CALCULATION OF PRELIMINARY SOIL CLEANUP GOALS

GEIGER (C&M OIL) SITE CALCULATION OF SOIL CLEANUP LEVELS

CONTAMINANTS REMAINING IN THE SOIL FOLLOWING A SITE CLEANUP MAY, OVER TIME LEACH INTO GROUNDWATER. A MODEL WAS DEVELOPED TO CALCULATE CONTAMINANT CONCENTRATIONS IN SOIL AT THE GEIGER SITE THAT WOULD NOT RESULT IN FUTURE EXCEEDANCES OF TARGET GROUNDWATER CONCENTRATIONS.

THE MODEL ASSUMES THAT A CERTAIN PERCENTAGE OF THE RAINFALL AT THE SITE WILL INFILTRATE THE SITE AND DESORB CONTAMINANTS FROM THE SOIL BASED ON AN EQUILIBRIUM SOIL-WATER PARTITIONING. IT IS FURTHER ASSUMED THAT THIS

CONTAMINATED INFILTRATION WILL MIX COMPLETELY WITH THE GROUNDWATER BELOW THE SITE, RESULTING IN AN EQUILIBRIUM GROUNDWATER CONCENTRATION. IN ORDER TO BACK CALCULATE SOIL CONCENTRATIONS, THE RATE OF MIXING OF INFILTRATION WITH GROUNDWATER IS FIRST ESTIMATED. STARTING WITH THE TARGET GROUNDWATER CLEANUP CONCENTRATIONS, THE MIXING RATE IS USED TO BACK CALCULATE CONTAMINANT CONCENTRATIONS IN THE INFILTRATION. THESE CONCENTRATIONS CAN BE RELATED TO SOIL CONCENTRATIONS USING THE SOIL-WATER EQUILIBRIUM RELATIONSHIP.

THE MIXING OF GROUNDWATER AND INFILTRATION AND THE RESULTANT CONTAMINANT CONCENTRATIONS IN GROUNDWATER ARE RELATED AS FOLLOWS (SUMMERS ET AL. 1980):

$$CGW = (QP\ CP)/(QP + QGW)$$

WHERE:

CGW = CONTAMINANT CONCENTRATION IN THE GROUNDWATER (UG/L);

QP = VOLUMETRIC FLOW RATE OF INFILTRATION (SOIL PORE WATER) INTO THE GROUNDWATER (FT3/DAY);

QGW = VOLUMETRIC FLOW RATE OF GROUNDWATER (FT3/DAY); AND

CP = CONTAMINANT CONCENTRATIONS IN THE INFILTRATION.

THE CONTAMINANT CONCENTRATIONS IN THE GROUNDWATER, CGW, ARE THE TARGET GROUNDWATER CLEANUP LEVELS, PROVIDED BY EPA AND SHOWN IN TABLE 1. THE VOLUMETRIC FLOW RATE OF INFILTRATION, QP, IS TAKEN AS THE TOTAL RAINFALL FROM THE SITE (REPORTED AS 49.1 INCHES PER YEAR IN THE RI REPORT) MINUS THE POTENTIAL EVAPOTRANSPIRATION OF 38 INCHES PER YEAR (GERAGHTY ET AL. 1973) OR 214 FT3/DAY. THE VOLUMETRIC FLOW RATE OF GROUNDWATER, QGW, IS ESTIMATED AS THE AVERAGE LINEAR GROUNDWATER VELOCITY TIMES THE AREA OF THE AQUIFER PERPENDICULAR TO THE GROUNDWATER FLOW ACROSS THE CONTAMINATED AREA OF THE SITE:

$$QGW = (V)(L)(D)$$

WHERE

V = GROUNDWATER VELOCITY = (K)(H)/N

WHERE K = HYDRAULIC CONDUCTIVITY (FT/DAY);
H = HYDRAULIC GRADIENT (FT/FT); AND
N = SOIL POROSITY (DIMENSIONLESS)

L = LENGTH OF THE AQUIFER PERPENDICULAR TO FLOW; AND
D = DEPTH OF THE AQUIFER.

VALUES FOR THE PARAMETERS LISTED ABOVE WERE TAKEN FROM THE RI REPORT,

EXCEPT FOR POROSITY, WHICH WAS ASSUMED TO BE 0.35 FOR SANDY SOIL (FREEZE AND CHERRY 1979). THIS RESULTS IN A FLOW OF 567 FT3/DAY. THE RATIO OF QGW PLUS QP TO QP (3.7) IS USED TO ESTIMATE CONCENTRATIONS OF THE

INDICATOR CHEMICALS IN THE INFILTRATION (CP).

THE SOIL WATER PARTITIONING MODEL IS EXPRESSED AS

$$CS = (KD)(CP)$$

WHERE

CS = SOIL CONCENTRATION, UG/KG;

CP = CONCENTRATIONS IN THE INFILTRATION, UG/LITER; AND

KD = AN EQUILIBRIUM PARTITION COEFFICIENT, ML/G.

THE CALCULATION OF PROTECTIVE SOIL CONCENTRATIONS IS PRESENTED IN TABLE 1. THE PARTITION COEFFICIENTS, KD, CAME FROM VARIOUS SOURCES. FOR THE ORGANIC COMPOUNDS (WITH THE EXCEPTION OF PCBS) THE PARTITION COEFFICIENT IS DEFINED AS

$$KD = (KOC)(FOC)$$

WHERE

KOC = THE ORGANIC CARBON PARTITION COEFFICIENT; AND

FOC = THE FRACTION OF ORGANIC CARBON IN THE SOIL.

KOC'S WERE TAKEN FROM THE LITERATURE AS NOTED IN THE TABLE. NO MEASUREMENTS FROM THE SITE WERE AVAILABLE, THEREFORE THE FRACTION OF ORGANIC CARBON IN THE SOIL WAS ASSUMED TO BE 0.5% -- TYPICAL FOR SANDY SOILS. FOR PCBS THE PARTITION COEFFICIENT WAS TAKEN FROM AN EMPIRICAL STUDY BY WEBER ET AL. (1983) ON SOILS WITH APPROXIMATELY 0.5% ORGANIC CARBON. PARTITION COEFFICIENTS FOR THE INORGANICS, LEAD AND CHROMIUM, WERE TAKEN FROM THE LITERATURE AS NOTED IN THE TABLE. THESE COEFFICIENTS ARE AVERAGE VALUES FROM LABORATORY TESTS. THEY ARE CONSIDERED LESS ACCURATE THAN THE COEFFICIENTS FOR ORGANIC CHEMICALS, SINCE THE PARTITIONING OF METALS IS DEPENDENT ON NUMEROUS FACTORS, INCLUDING PH, OXIDATION-REDUCTION POTENTIAL AND THE PRESENCE OF OTHER METALS IN THE SOIL.

THE MODEL ASSUMES AN EQUILIBRIUM PARTITIONING OF THE CONTAMINANT BETWEEN THE SOIL AND THE SOIL PORE WATER, WHICH MAY OCCUR AFTER A LONG PERIOD OF TIME. THE MODEL PROBABLY THEREFORE OVERESTIMATES THE CONCENTRATION IN GROUNDWATER ASSOCIATED WITH AN ACTUAL SOIL CONCENTRATION. IT IS THEREFORE LIKELY TO RESULT IN A LOWER SOIL CLEANUP LEVEL SINCE IT DOES NOT ACCOUNT FOR ATTENUATION OF THE CONTAMINANTS IN THE UNSATURATED ZONE, BIODEGRADATION, OR CHEMICAL DEGRADATION OF THE CONTAMINANTS. THESE

FACTORS CANNOT BE INCLUDED IN THE MODEL WITHOUT EXTENSIVE PHYSICAL AND CHEMICAL TESTING OF THE SOIL AND TIME-DEPENDENT GROUNDWATER MONITORING.

THE PROTECTIVE SOIL CONCENTRATIONS, AS DERIVED ABOVE, WERE THEN REVIEWED TO ASSESS THE RISK FROM DIRECT CONTACT. THIS ASSESSMENT IS PRESENTED IN TABLE 2. THE EXPOSURE SCENARIOS EXAMINED WERE THE SAME AS THOSE PRESENTED IN THE PHE: A CURRENT-USE SCENARIO INVOLVING ON-SITE WORKERS AND A FUTURE-USE SCENARIO INVOLVING CHILDREN. THE TABLE IS DIVIDED INTO CARCINOGENS AND NONCARCINOGENS. FOR THE CARCINOGENS, THE EXCESS LIFETIME CANCER RISKS RANGE FROM APPROXIMATELY 6 X 10-7 TO 1 X 10-11 VERSUS THE REFERENCE RISK LEVEL OF 10-6.

NONCARCINOGENS, EXCEPT FOR LEAD, ARE ASSESSED USING A HAZARD INDEX, WHICH IS DEFINED AS THE RATIO OF THE CHEMICAL INTAKE TO THE ACCEPTABLE DAILY INTAKE. A HAZARD INDEX OF GREATER THAN 1 INDICATES A POTENTIAL UNACCEPTABLE RISK. ALL OF THE HAZARD INDICES ARE LESS THAN ONE. FOR LEAD, EPA DOES NOT CONSIDER THE CALCULATION OF AN ACCEPTABLE INTAKE TO BE APPROPRIATE BECAUSE OF HIGH BACKGROUND LEAD EXPOSURE FOR THE ENTIRE POPULATION. HOWEVER, THE CENTERS FOR DISEASE CONTROL HAS FOUND THAT BLOOD LEAD LEVELS IN CHILDREN, LIVING NEAR LEAD SOURCES APPEAR TO INCREASE ABOVE BACKGROUND LEVELS ONLY WHEN LEAD CONCENTRATIONS IN SOIL EXCEED 500-1,000 MG/KG -- SIGNIFICANTLY ABOVE THE 166.5 MG/KG ESTIMATED CLEANUP LEVEL (CDC 1985).

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#RS

RESPONSIVENESS SUMMARY
GEIGER (C&M OIL) SITE
CHARLESTON COUNTY, SOUTH CAROLINA

THE GEIGER (C&M OIL) HAZARDOUS WASTE SITE HAS BEEN THE FOCUS OF A REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (RI/FS), CONDUCTED UNDER EPA'S SUPERFUND PROGRAM. THIS RI/FS PROCESS BEGAN WHEN THE SITE WAS PLACED ON THE NATIONAL PRIORITIES LIST (NPL) IN SEPTEMBER, 1983. SINCE THAT TIME, EPA HAS ATTEMPTED TO ADDRESS COMMUNITY CONCERNS IN AN ONGOING COMMUNITY RELATIONS PROGRAM.

THIS RESPONSIVENESS SUMMARY HAS BEEN PREPARED TO PRESENT A SUMMARY OF COMMUNITY CONCERNS ABOUT THE GEIGER SITE WHICH HAVE BEEN RAISED DURING RI/FS ACTIVITIES. EPA'S EFFORTS TO ADDRESS THESE CONCERNS ARE ALSO DISCUSSED.

THIS RESPONSIVENESS SUMMARY INCLUDES THREE SECTIONS, AS FOLLOWS:

SECTION 1 OVERVIEW - THIS SECTION DISCUSSES EPA'S RECOMMENDED ALTERNATIVE, AND LIKELY PUBLIC REACTION TO THIS REMEDY.

SECTION 2 COMMUNITY RELATIONS ACTIVITIES AND COMMUNITY CONCERNS - THIS SECTION ADDRESSES COMMUNITY RELATIONS ACTIVITIES

INITIATED BY EPA, AND SUMMARIZES THE PRIMARY CONCERNS WHICH LOCAL CITIZENS HAVE ABOUT THIS SITE.

SECTION 3 SUMMARY OF PUBLIC COMMENTS AND EPA RESPONSES - THIS SECTION PRESENTS COMMENTS MADE BY CITIZENS AT THE PUBLIC MEETING HELD TO DISCUSS EPA'S REMEDIAL ALTERNATIVES, AND PRESENTS WRITTEN COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD WHICH FOLLOWED THIS MEETING. EPA'S RESPONSES TO THESE COMMENTS ARE ALSO PROVIDED.

1.0 OVERVIEW

1.1 RECOMMENDED ALTERNATIVE

A PUBLIC MEETING WAS HELD AT THE HOLLYWOOD TOWN HALL IN HOLLYWOOD, SOUTH CAROLINA ON JANUARY 29, 1987. THE REMEDIAL ALTERNATIVES DEVELOPED IN THE FEASIBILITY STUDY WERE PRESENTED AT THIS MEETING, AND COMMENTS ON THE ALTERNATIVES WERE SOLICITED. THIS MEETING MARKED THE START OF A THREE-WEEK PUBLIC COMMENT PERIOD, DURING WHICH TIME CITIZENS WERE REQUESTED TO SUBMIT WRITTEN COMMENTS ON THE PROPOSED ALTERNATIVES.

AT THE TIME OF THE PUBLIC MEETING, A RECOMMENDED ALTERNATIVE HAD NOT BEEN SELECTED. THE PUBLIC WAS INFORMED THAT ALL OF THE ALTERNATIVES PRESENTED IN THE FEASIBILITY STUDY WERE UNDER CONSIDERATION. THE REMEDIAL ALTERNATIVE RECOMMENDED FOR THIS SITE SPECIFIES EXTRACTION, TREATMENT, AND OFF-SITE DISCHARGE OF CONTAMINATED GROUNDWATER. EXCAVATION, INCINERATION, OPTIONAL STABILIZATION/SOLIDIFICATION, AND REPLACEMENT OF CONTAMINATED SOIL IS ALSO RECOMMENDED. THIS ALTERNATIVE IS DETAILED IN THE SUMMARY OF REMEDIAL ALTERNATIVE SELECTION, WHICH IS PART OF THE RECORD OF DECISION TO BE SUBMITTED FOR REVIEW AND APPROVAL BY THE EPA, REGION IV, REGIONAL ADMINISTRATOR.

1.2 EXPECTED PUBLIC REACTION

AT THE PUBLIC MEETING, NO COMMENTS WERE MADE BY THE PUBLIC EXPRESSING A PREFERENCE FOR A PARTICULAR ALTERNATIVE; HOWEVER, ONE CITIZEN SAID THAT IT WOULD BE EASIER TO OFFER COMMENTS IF EPA INDICATED WHICH ALTERNATIVE WOULD BE CHOSEN.

NO OPPOSITION BY THE PUBLIC TO THE RECOMMENDED ALTERNATIVE IS EXPECTED. THE RECOMMENDED ALTERNATIVE IS A PERMANENT REMEDY, WHICH WILL ELIMINATE OR REDUCE THE THREAT OF EXPOSURE TO CONTAMINATED SOIL AND GROUNDWATER UNDER BOTH PRESENT AND FUTURE-USE SCENARIOS. THIS IS IN AGREEMENT WITH THE GENERAL PUBLIC OPINION THAT FUTURE THREATS TO HUMAN HEALTH ASSOCIATED WITH THIS SITE SHOULD BE ALLEVIATED.

AN EDITORIAL IN THE CHARLESTON EVENING POST ON JANUARY 21, 1987, URGED CLEAN-UP OF THE SITE, AND ADVOCATED INCINERATION AS A TREATMENT FOR SOIL CONTAMINATION (APPENDIX A).

2.0 COMMUNITY RELATIONS ACTIVITIES AND COMMUNITY CONCERNS

2.1 EPA COMMUNITY RELATIONS ACTIVITIES

EPA INITIATED COMMUNITY RELATIONS ACTIVITIES AT THE GEIGER SITE BY DEVELOPING A COMMUNITY RELATIONS PLAN (CRP) FOR THE SITE. THE CRP, FINALIZED MAY 20, 1985, DESCRIBES THE HISTORY OF CITIZEN INVOLVEMENT AT THE GEIGER SITE AND OUTLINES PROPOSED COMMUNITY RELATIONS ACTIVITIES WHICH WERE TO BE FOLLOWED DURING THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY.

A PUBLIC INFORMATION REPOSITORY WAS ESTABLISHED AT THE HOLLYWOOD TOWN HALL FOR THE PURPOSE OF MAINTAINING INFORMATION ON THE SITE IN A LOCATION WHICH WOULD BE ACCESSIBLE TO LOCAL RESIDENTS. THE CRP, FACT SHEETS, RI/FS DOCUMENTS, AND GENERAL SUPERFUND LITERATURE WERE PLACED IN THE REPOSITORY AS THEY WERE DEVELOPED.

LELA DICKERSON, MAYOR OF HOLLYWOOD, WAS THE PRIMARY INFORMATION CONTACT. COMMUNITY RELATIONS ACTIVITIES WERE COORDINATED WITH MAYOR DICKERSON TO ASSURE THAT INFORMATION WAS DISSEMINATED THROUGHOUT THE COMMUNITY.

AN INFORMAL MEETING WAS HELD WITH LOCAL RESIDENTS IN JULY 1985 TO DISCUSS RI/FS ACTIVITIES AT THE SITE. A FACT SHEET (APPENDIX C) WAS PREPARED TO INFORM THE PUBLIC ON UPCOMING ACTIVITIES.

A FACT SHEET SUMMARIZING THE RESULTS OR THE REMEDIAL INVESTIGATION WAS PREPARED IN SEPTEMBER 1986 AND WAS MAILED TO ALL ELECTED OFFICIALS, LOCAL CITIZENS, AND OTHER INTERESTED PARTIES IDENTIFIED IN THE CRP. THE RESULTS OF THE INVESTIGATION WERE DISCUSSED AT A PUBLIC MEETING HELD BY EPA ON SEPTEMBER 9, 1986, AT THE HOLLYWOOD TOWN HALL. THE FACT SHEET IS CONTAINED IN APPENDIX C, ALONG WITH THE PRESS RELEASE ANNOUNCING THIS MEETING.

FOLLOWING COMPLETION OF THE FEASIBILITY STUDY, A FACT SHEET (APPENDIX C) WAS PREPARED TO SUMMARIZE THE PROPOSED ALTERNATIVES AND TO SOLICIT COMMENTS ON THESE ALTERNATIVES. THIS FACT SHEET WAS SENT TO ALL INTERESTED PARTIES IDENTIFIED IN THE CRP. A LEGAL NOTICE (APPENDIX B) SUMMARIZING THE ALTERNATIVES AND ANNOUNCING THE PUBLIC COMMENT PERIOD WAS PRINTED IN THE CHARLESTON NEWS AND COURIER ON JANUARY 11 AND JANUARY 28, 1987.

A PUBLIC MEETING WAS HELD AT THE HOLLYWOOD TOWN HALL ON JANUARY 29, 1987, TO PRESENT A SUMMARY OF THE FEASIBILITY STUDY AND TO RECEIVE COMMENTS ON THE REMEDIAL ALTERNATIVES. APPROXIMATELY 35 PEOPLE ATTENDED THIS MEETING, AND MEDIA INTEREST WAS HIGH. A PRESS ADVISORY ANNOUNCING THIS MEETING IS CONTAINED IN APPENDIX C. A TRANSCRIPT OF THE MEETING WAS PREPARED AND PLACED IN THE INFORMATION REPOSITORY. A SUMMARY OF COMMENTS MADE AT THE MEETING, ALONG WITH EPA'S RESPONSES, IS PRESENTED IN SECTION 3.0.

IN RESPONSE TO COMMENTS THAT DRUMS MAY HAVE BEEN BURIED ON THE GEIGER SITE, EPA CONDUCTED AN INVESTIGATION ON FEBRUARY 12, 1987, TO LOCATE POSSIBLE BURIED DRUMS. THIS INVESTIGATION REVEALED NO DRUMS BURIED ON

THE SITE. A FACT SHEET (APPENDIX C) SUMMARIZING THE RESULTS OF THIS INVESTIGATION WAS PREPARED AND SENT TO ALL INTERESTED PARTIES IDENTIFIED IN THE CRP.

THE JANUARY 29 PUBLIC MEETING MARKED THE START OF A THREE-WEEK COMMENT PERIOD, WHICH ENDED FEBRUARY 19, 1987. DURING THIS PERIOD, THE PUBLIC WAS INVITED TO SUBMIT ORAL OR WRITTEN COMMENTS REGARDING PROPOSED REMEDIAL ACTIONS TO EPA. ONLY ONE PERSON SUBMITTED COMMENTS DURING THIS PERIOD. THESE COMMENTS AND EPA'S RESPONSE ARE SUMMARIZED IN SECTION 3.2.

AT THE PUBLIC MEETING, A CITIZEN ASKED IF THE COMMENT PERIOD COULD BE EXTENDED BECAUSE EPA WAS TO CONDUCT AN INVESTIGATION FOR BURIED DRUMS. EPA'S RESPONSE WAS THAT THE COMMENT PERIOD COULD BE EXTENDED AT THE REQUEST OF THE PUBLIC IF DRUMS WERE FOUND. THE INVESTIGATION SHOWED NO DRUMS BURIED ON-SITE, AND NO REQUESTS FOR EXTENSION OF THE COMMENT PERIOD WERE RECEIVED.

2.2 MEDIA INVOLVEMENT

INTEREST SHOWN BY THE MEDIA HAS BEEN HIGH AT THE GEIGER SITE. BOTH PUBLIC MEETINGS RECEIVED NEWS COVERAGE BY CHARLESTON NEWSPAPERS AND TELEVISION STATIONS. NEWSPAPER REPORTS AND EDITORIALS ARE CONTAINED IN APPENDIX A OF THIS RESPONSIVENESS SUMMARY.

2.3 COMMUNITY CONCERNS

THE MAJOR CONCERNS OF CITIZENS REGARDING THE GEIGER SITE ARE OUTLINED BELOW. THESE CONCERNS WERE STATED AT THE PUBLIC MEETING HELD JANUARY 29, 1987, AND DURING THE THREE-WEEK PUBLIC COMMENT PERIOD WHICH FOLLOWED THIS MEETING.

2.3.1 CONCERNS OVER SAFE DRINKING WATER

SEVERAL CITIZENS EXPRESSED CONCERNS ABOUT WHETHER THEIR DRINKING WATER WAS FREE FROM CONTAMINATION. EPA'S POSITION, AS STATED AT THE PUBLIC MEETING, IS THAT CONTAMINATION FROM THE GEIGER SITE IS NOT MIGRATING INTO RESIDENTIAL WELLS NEAR THE SITE, EITHER UP-GRADIENT OR DOWN-GRADIENT OF THE SITE.

LOCAL OFFICIALS ARE ATTEMPTING TO SUPPLY PUBLIC DRINKING WATER TO RESIDENTS IN THE AREA OF THE SITE, AND HAVE ASKED EPA TO STATE THAT PUBLIC WATER SHOULD BE PROVIDED BECAUSE OF UNCERTAINTIES IN THE REMEDIAL INVESTIGATION RESULTS. LOCAL OFFICIALS CONTEND THAT THIS RECOMMENDATION IS NECESSARY FOR APPROVAL OF THEIR APPLICATION FOR GRANT MONEY FOR THE WATER SUPPLY SYSTEM. EPA HAS CONCLUDED THAT THE DRINKING WATER SUPPLIED BY RESIDENTIAL WELLS IS NOT ENDANGERED BY THE SITE AT THIS TIME, AND

PUBLIC WATER SUPPLIES ARE NOT WARRANTED ON THE BASIS OF A PUBLIC HEALTH THREAT FROM THE SITE. REMEDIAL ACTIVITIES WILL BE PERFORMED BY EPA BEFORE RESIDENTIAL DRINKING WATER SUPPLIES ARE THREATENED.

2.3.2 CONCERNS OVER DRUM BURIAL ON THE SITE

SEVERAL CITIZENS FELT THAT THE SITE HAS NOT BEEN ADEQUATELY CHARACTERIZED BECAUSE AN INVESTIGATION FOR BURIED DRUMS HAD NOT BEEN PERFORMED. LOCAL RESIDENTS REPORTED THAT DRUMS CONTAINING HAZARDOUS MATERIALS HAD BEEN BURIED IN PITS ON THE SITE.

EPA CONDUCTED AN INVESTIGATION OF THE SITE ON JANUARY 12, 1987, TO SEARCH FOR BURIED DRUMS. NO BURIED DRUMS WERE LOCATED. A FACT SHEET SUMMARIZING THIS INVESTIGATION WAS SENT TO INTERESTED PARTIES IDENTIFIED IN THE CRP.

3.0 SUMMARY OF PUBLIC COMMENTS AND EPA RESPONSES

3.1 COMMENTS AND RESPONSES MADE AT PUBLIC MEETING

A PUBLIC MEETING WAS HELD ON FEBRUARY 19, 1987, IN THE CITY OF HOLLYWOOD, SOUTH CAROLINA TO DISCUSS THE REMEDIAL ALTERNATIVES BEING CONSIDERED FOR IMPLEMENTATION AT THE GEIGER (C&M OIL) SITE. EPA DID NOT INDICATE A PREFERENCE FOR ANY PARTICULAR ALTERNATIVE, AND ANNOUNCED THAT ALL ALTERNATIVES PRESENTED IN THE FEASIBILITY STUDY WERE STILL UNDER CONSIDERATION.

COMMENTS MADE BY THE PUBLIC AT THIS MEETING ARE SUMMARIZED BELOW, ALONG WITH EPA RESPONSES. THE COMMENTS HAVE BEEN GROUPED ACCORDING TO SUBJECT. WHERE SEVERAL SIMILAR COMMENTS WERE MADE, THESE WERE SUMMARIZED INTO ONE STATEMENT. WHERE A CLEAR AND COMPLETE COMMENT WAS NOT MADE, ADDITIONAL INFORMATION HAS BEEN BRACKETED TO INDICATE EPA'S INTERPRETATION. RESPONSES IN BRACKETS ARE FOR CLARIFICATION, AND WERE NOT MADE AT THE PUBLIC MEETING.

3.1.1 COMMENTS ON REMEDIAL INVESTIGATION PROCEDURES AND RESULTS

COMMENT: ARE THE MONITORING WELLS USED DURING THE REMEDIAL INVESTIGATION STILL IN PLACE?

EPA RESPONSE: YES, THESE WELLS ARE STILL IN PLACE.

HOW DEEP IS THE COOPER MARL?

THE COOPER MARL IS APPROXIMATELY 45 FEET DEEP, VARYING WITH LAND ELEVATION. (THE COOPER MARL IS A FORMATION WHICH ACTS AS A CONFINING LAYER TO IMPEDE VERTICAL GROUNDWATER FLOW FROM THE SURFICIAL AQUIFER INTO THE UNDERLYING SANTEE LIMESTONE AQUIFER.).

WHAT SIGNS OF CONTAMINATION WERE DETECTED IN MONITORING WELL CLUSTER

NUMBER 5?

LOW LEVELS OF LEAD AND CHROMIUM WERE FOUND IN THAT WELL CLUSTER.

WERE THE LEAD AND CHROMIUM LEVELS IN MONITORING WELL CLUSTER NUMBER 5 WITHIN SAFE DRINKING WATER STANDARDS?

THE LEAD CONCENTRATION WAS AROUND 60 MICROGRAMS PER LITER (UG/L); THE DRINKING WATER STANDARD IS 50 UG/L.

(LEAD WAS ACTUALLY DETECTED AT 53 UG/L IN MONITORING WELL 5-SHALLOW. THE MAXIMUM CONTAMINANT LEVEL (MCL) ESTABLISHED UNDER THE SAFE DRINKING WATER ACT IS 50 UG/L.).

WAS THE CONTAMINATION IN CLUSTER 5 IN THE SHALLOW, MEDIUM, OR DEEP WELL?

THE LEAD CONTAMINATION WAS IN THE SHALLOW WELL.

HOW DEEP IS THE SHALLOW WELL IN CLUSTER 5?

SHALLOW WELLS ARE GENERALLY FIVE TO SEVEN FEET DEEP; RIGHT AT THE WATER TABLE, ESSENTIALLY.

YOU'RE SAYING THE WATER WAS TESTED, BUT WAS A SPECIFIC TEST DONE FOR DRINKING WATER? I FEEL THAT YOU CAN TEST WATER AND IT CAN COME BACK SAFE, BUT I THINK TESTING SPECIFICALLY FOR DRINKING WATER IS A DIFFERENT THING.

THE TESTS THAT ARE CONDUCTED ON (GROUNDWATER FROM) ALL THESE WELLS, AND ON THE SOILS, SURFACE WATER, AND SEDIMENTS, ARE FOR A RATHER EXTENSIVE LIST (OF CHEMICALS) CALLED THE HAZARDOUS SUBSTANCES LIST (HSL). THE HSL CONTAINS 13 METALS AND 128 ORGANIC COMPOUNDS WHICH ARE ANALYZED FOR.

(ALTHOUGH GROUNDWATER IS ANALYZED FOR HAZARDOUS SUBSTANCES, AESTHETIC PROPERTIES RELATED TO USE OF THE WATER FOR DRINKING (I.E., TASTE, APPEARANCE) ARE NOT ANALYZED.).

DOES THE HSL INCLUDE THE VOLATILE COMPOUNDS?

YES, THE HSL INCLUDES VOLATILE ORGANIC COMPOUNDS (VOCS).

WHO DID THE TESTING (OF GROUNDWATER SAMPLES)?

TESTING IS CARRIED OUT BY A GROUP OF LABORATORIES UNDER THE CONTRACT LABORATORY PROGRAM (CLP). CLP IS A PROGRAM RUN BY EPA SPECIFICALLY TO TEST SAMPLES FROM HAZARDOUS WASTE SITES.

IN THIS REPORT (THE REMEDIAL INVESTIGATION REPORT AND THE FEASIBILITY STUDY), WHY WASN'T IT SAID WHAT SPECIFIC LABORATORY TESTED WHICH SAMPLES?

THERE WERE MANY LABORATORIES USED. IN THE CONTRACT LABORATORY PROGRAM, WE DON'T KNOW WHICH LAB IS GOING TO BE USED UNTIL THE ACTUAL WEEK OF THE

TESTING, SO IF WE SAMPLED FOR SEVEN OR EIGHT WEEKS, WE USED SEVEN OR EIGHT LABS AROUND THE COUNTRY.

DO YOU KNOW THE NAMES OF THE LABS WHICH DID THE TESTING, AND CAN THAT BE MADE AVAILABLE TO US?

YES, THIS INFORMATION CAN BE MADE AVAILABLE TO THE PUBLIC.

CAN WE GET THIS INFORMATION BEFORE THE END OF THE PUBLIC COMMENT PERIOD ON FEBRUARY 19?

YES, IF WE RECEIVE A REQUEST FOR THIS INFORMATION BEFORE THAT TIME, THE LIST OF LABS WILL BE SENT OUT IMMEDIATELY. (NO REQUESTS FOR THIS INFORMATION WERE RECEIVED.).

I WOULD LIKE TO KNOW HOW THE WELLS WERE DRILLED, HOW THEY WERE PUT IN, WHAT PROCESS WAS INVOLVED? DID YOU USE WATER IN THE PROCESS OF PUTTING THOSE WELLS IN?

THE PROTOCOL WE USED FOR PUTTING IN THE WELLS WAS DEVELOPED BY EPA REGION IV. WE USED A MUD ROTARY METHOD FOR DRILLING THE WELLS, WHEREBY THE DRILL BIT IS ADVANCED. AS IT'S ADVANCED WE PUMP WATER MIXED WITH BENTONITE CLAY DOWN THE HOLE TO KEEP THE SIDES FROM COLLAPSING. ONCE THE HOLE IS DRILLED TO THE DEPTH WE WANT, WE PLACE A FOUR-INCH STAINLESS STEEL WELL PIPE DOWN THE HOLE. PRIOR TO PLACING THE (STAINLESS STEEL) PIPE INTO THE HOLE, IT IS THOROUGHLY DECONTAMINATED. THE BACK OF THE DRILLING RIG AND ANY PIECE OF EQUIPMENT THAT GOES DOWN THE HOLE IS DECONTAMINATED PRIOR TO MOVING OVER THE (DRILLING) LOCATION. THAT WAY WE INSURE THAT WE ARE NOT ADDING CONTAMINANTS TO THE GROUNDWATER AND THAT WE'RE NOT MOVING THEM AROUND THE SITE. THE SCREEN USED WAS A FIVE-FOOT SCREEN AND THE WELL (CASING) WAS SCREWED TOGETHER IN TEN-FOOT LENGTHS.

WHAT SOURCE OF WATER WAS UTILIZED DURING THE (DRILLING) PROCESS?

THE SOURCE OF WATER WAS A FIRE HYDRANT LOCATED ON HIGHWAY 162, ABOUT 200 OR 300 FEET FROM THE ENTRANCE TO THE SITE. THE WATER SOURCE WAS TESTED, ALONG WITH THE (GROUNDWATER) SAMPLES (FROM THE WELLS).

COULD THE WATER THAT WAS UTILIZED (DURING DRILLING) HAVE DILUTED THE CONTAMINANTS THAT WERE IN THE WATER THAT YOU WITHDREW AS SAMPLES?

AS WE'RE DRILLING THE WELLS, WE RECORD THE AMOUNT OF WATER THAT WE USE. PRIOR TO SAMPLING, WE DO WHAT IS CALLED "DEVELOPING THE WELL," WHEREBY WE PUMP THE WELL. THE MINIMUM AMOUNT OF WATER WE PUMP OUT OF THE WELL IS EQUAL TO OR GREATER THAN WHAT WE PUT IN. WE ALSO TAKE TEMPERATURE AND CONDUCTIVITY READINGS AND WE PUMP UNTIL WE GET A STABLE READING OF

THESE MEASUREMENTS. ONCE THESE HAVE STABILIZED, THAT GENERALLY INDICATES THAT WE ARE PUMPING ACTUAL GROUNDWATER AND NOT ANYTHING THAT WAS USED FOR WELL CONSTRUCTION. PRIOR TO SAMPLING, WE ALLOW THE WELLS

TO SIT FOR SEVERAL DAYS AFTER THEY HAVE BEEN DEVELOPED. BEFORE SAMPLING, WE WITHDRAW THREE TO FIVE WELL VOLUMES, TO INSURE WE DON'T HAVE ANYTHING (WATER USED DURING CONSTRUCTION) REMAINING.

WHY DID YOU USE MUD BORE INSTEAD OF USING A HOLLOW BORE (FOR DRILLING THE MONITORING WELLS)? I REALIZE THAT TYPE OF SOIL DOES COLLAPSE, BUT WITH A HOLLOW BORE YOU'RE ABLE TO BRING OUT THAT SOIL AND TEST IT, AND THEN LATER GO IN WITH A MUD BORE.

THAT DECISION WAS MADE BASED ON THE SOIL CONDITIONS AT THE SITE. AS YOU SAY, WITH THE HOLLOW STEM METHOD, YOU RUN THE RISK OF COLLAPSING THE HOLE WHEN YOU PULL THE DRILL STEMS OUT, BUT WE WERE ALSO CONCERNED ABOUT BINDING OF THE AUGER AS WE WENT DOWN. WE HAD REPORTS THAT IN SIMILAR SOILS THE AUGERS TENDED TO BIND UP, SO IT WAS DECIDED THAT WE WOULD USE THE MUD ROTARY METHOD TO ADVANCE THE HOLES. WE FELT WE COULD GET A GOOD INDICATION OF THE LEVEL OF SOIL CONTAMINATION FROM OUR HAND-AUGERED HOLES SO WE DID NOT SAMPLE THE SOILS AS WE WENT DOWN.

THE TESTS YOU DID ON THE GROUNDWATER WERE MORE EXTENSIVE THAN YOU WOULD DO FOR DRINKING WATER; ISN'T THAT CORRECT?

A TYPICAL WATER TREATMENT PLANT NORMALLY DOES NOT TEST FOR THE SUBSTANCES THAT ARE ON THE HSL; IT MAY TEST FOR SOME OF THEM, BUT IT'S USUALLY NOT NEARLY AS EXTENSIVE.

WHY DID YOU GO BEYOND (WHAT A WATER TREATMENT PLANT NORMALLY TESTS FOR)?

IT IS THE STANDARD PROCEDURE TO TEST FOR ALL OF THESE COMPOUNDS. (THE HSL WAS DEVELOPED BASED ON THE WIDE RANGE OF HAZARDOUS CHEMICALS WHICH ARE LIKELY TO BE DETECTED AT UNCONTROLLED HAZARDOUS WASTE SITES.).

I HAVEN'T HEARD ANYONE MENTION THE IRON CONTENT IN THE SURFACE WATER THAT YOU WERE TESTING, WHICH IS REQUIRED.

IRON IS NOT AN HSL CHEMICAL. IT WAS TESTED FOR, AND IF YOU REQUEST THAT INFORMATION, IT CAN BE PROVIDED. (NO REQUESTS FOR THIS INFORMATION WERE RECEIVED.).

YOU SAID THAT YOU TESTED THREE RESIDENTIAL WELLS: I THOUGHT THE RECORD SHOWED YOU TESTED FOUR?

THREE RESIDENTIAL WELLS WERE TESTED: THE CLARK WELL, MAXWELL WELL, AND DUNMIRE WELL.

(SEVERAL COMMENTS WERE MADE CONCERNING THE LOCATION OF RESIDENTIAL WELLS. NO REPLIES WERE MADE BY EPA.).

WERE THE RESIDENTIAL WELLS (WHICH WERE SAMPLED) UPGRADIENT FROM THE SITE?

YES, THE RESIDENTIAL WELLS WERE UPGRADIENT FROM THE SITE.

(SEVERAL COMMENTS WERE MADE CONCERNING WHY EPA DID NOT SAMPLE RESIDENTIAL WELLS LOCATED DOWNGRADIENT OF THE SITE.).

AT THIS POINT, THE GROUNDWATER HAS NOT MOVED FAR ENOUGH TO EFFECT RESIDENTIAL WELLS DOWNGRADIENT OF THE SITE. MONITOR WELLS WERE PLACED BETWEEN THE SITE AND THESE RESIDENTIAL WELLS, AND THE LEVELS OF CONTAMINANTS DETECTED WERE NOT HIGH ENOUGH TO WARRANT CONCERN OVER THE POSSIBILITY OF THE DOWNGRADIENT RESIDENTIAL WELLS BEING CONTAMINATED AT THIS TIME.

YOU SAID THAT THERE WAS A PIPE THAT DRAINED FROM ONE OF THE LAGOONS (ON-SITE PONDS). WE KNOW THAT IT COMES UNDERNEATH THE RAILROAD. THERE'S A DRAINAGE DITCH THAT COMES FROM THAT PIPE THAT GOES INTO WALLACE CREEK. IT ALSO GOES INTO LOG BRIDGE CREEK. LOG BRIDGE CREEK GOES INTO THE STONO RIVER.

THERE IS A SMALL DRAINAGE STREAM THAT CONNECTS TO THE NORTHERN POND THAT PROBABLY DRAINS TOWARD LOG BRIDGE CREEK, AND THAT IS WHAT WE TESTED.

THE BORROW PIT ABOVE THE NORTHERN POND WAS NOT TESTED, WAS IT?

NO, IT WAS NOT TESTED.

HOW CLOSE IS THE CLOSEST DOWNGRADIENT WELL THAT WAS TESTED?

THE THIRD RESIDENTIAL WELL THAT WAS TESTED IS LOCATED IN THE SOUTHWEST CORNER OF THE SITE WHERE THE TRAILER IS. THAT WOULD PROBABLY BE THE CLOSEST DOWNGRADIENT WELL; HOWEVER, WE BELIEVE THAT WELL IS SCREENED BELOW THE COOPER MARL.

(IN RESPONSE TO A REMARK BY A PARTICIPANT THAT ABOUT 35 FAMILIES LIVE IN THE AREA OF THE SITE, ANOTHER PARTICIPANT COMMENTED THAT THE TESTING OF THREE WELLS IS INADEQUATE TO PRODUCE A CONCLUSIVE INVESTIGATION REPORT.).

TEN PERCENT OF THE WELLS IS A GOOD NUMBER TO PRODUCE ADEQUATE RESULTS. BECAUSE ONLY TEN RESIDENTIAL WELLS ARE UPGRADIENT OF THE SITE IN THE IMMEDIATE VICINITY, ACTUALLY THIRTY PERCENT OF THE WELLS UNDER CONCERN WERE TESTED.

WAS THE OIL-STAINED AREA INDICATED ON THE SITE MAP THE ONLY VISIBLE OIL YOU FOUND? THERE IS BLACK OIL ALL THE WAY TO THE RAILROAD TRACKS.

DURING THE REMEDIAL INVESTIGATION, WE TOOK SOIL SAMPLES FOR 500 OR 600

FEET IN THAT DIRECTION.

(SEVERAL COMMENTS WERE MADE CONCERNING PAST ACTIVITIES AT THE SITE, SUCH

AS ILLEGAL DUMPING, AND DIGGING OF DEEPER PITS THAN HAVE BEEN REPORTED IN THE RI. THESE COMMENTS MAY BE FOUND IN THEIR ENTIRETY ON PAGES 69-72 OF THE PUBLIC HEARING TRANSCRIPT.).

WE FEEL THAT WE HAVE ENOUGH DATA AT THE PRESENT TIME, WITH THE EXCEPTION OF POSSIBLE DRUMS IN THE (AREA OF) THE NORTHERN POND, TO CHARACTERIZE THE SITE, AND TO KNOW THE TYPE AND EXTENT OF CHEMICALS ON THE SITE. AS FOR PAST PRACTICES, THERE IS NO WAY TO DOCUMENT WHAT HAS REALLY HAPPENED. ALL WE CAN DO IS WORK WITH WHAT WE HAVE NOW, AND TRY TO CLEAN THAT UP. THAT IS WHAT WE ARE TRYING TO DO.

THIS (CONTAMINATION AT THE GEIGER SITE) HAS BEEN GOING ON SINCE 1969 AND 1970. ISN'T THAT A FACTOR THAT IS INVOLVED?

THE OTHER THING THAT IS FACTORED INTO OUR EVALUATION IS DILUTION. (DILUTION REFERS TO THE DECREASE IN CONTAMINANT LEVELS OVER TIME.).

"DOWNFLOW" OF THE WATER YOU ARE TALKING ABOUT; THAT GOES TOWARD A LARGE WOODED AREA. IS THAT RIGHT?

YES. (GROUNDWATER AND SURFACE WATER FLOW TOWARD A WOODED AREA.).

WHERE WOULD YOU THINK THE CLOSEST WELL WOULD BE, GOING THROUGH THAT LARGE WOODED AREA?

IT WOULD PROBABLY BE A QUARTER OR HALF OF A MILE.

HOW MANY FEET HAS THE CONTAMINATED GROUNDWATER MOVED?

APPROXIMATELY 300 FEET OVER THE LAST 16 YEARS.

WOULD MONITORING WELL CLUSTER NUMBER 6 BE DOWNGRADIENT OF WHERE THE BURIED DRUMS ARE?

YES.

TESTS WERE MADE DURING THE DRY SEASON. WHEN THERE IS AN UNUSUALLY HIGH TIDE, IS THERE A POSSIBILITY THAT THE RESULTS WOULD BE DIFFERENT?

THE EFFECT OF TIDES AT THIS LOCATION DID NOT APPEAR TO BE SIGNIFICANT. THAT IS NOT BASED ON ANY RIGOROUS TEST, BUT WAS BASED ON THE LOCATION OF THE SITE RELATIVE TO THE TIDAL AREAS AND WHAT IS GENERALLY KNOWN FOR THIS AREA IN TERMS OF THE GROUNDWATER. WE DIDN'T FEEL THAT THE TIDES WOULD HAVE A SIGNIFICANT EFFECT.

3.1.2 COMMENTS ON REMEDIAL ALTERNATIVES

WHO WILL DO THE REMEDIAL DESIGN?

THAT HASN'T BEEN DETERMINED YET. WE HAVE A DIFFERENT PROCESS FOR

SELECTING THE CONTRACTOR FOR THE REMEDIAL DESIGN.

WOULD YOU USE A DIFFERENT GROUP (THAN THE ONES WHO DID THE RI/FS)?

THAT HAS NOT BEEN DETERMINED YET.

WHAT KIND OF TIME FRAME DO YOU FORESEE FOR THIS REMEDIAL ACTION?

WE HOPE TO HAVE THE REMEDY SELECTED BY THE END OF MARCH. FOLLOWING THAT, THERE IS THREE-MONTH PERIOD IN WHICH WE AGAIN TRY TO IDENTIFY RESPONSIBLE PARTIES WHO CONTRIBUTED TO THE CONTAMINATION, AND WE OFFER THEM THE OPPORTUNITY TO PAY FOR THE CLEAN-UP. IF NO RESPONSIBLE PARTIES ARE FOUND, THEN WE WILL PROCEED WITH THE REMEDIAL DESIGN. IT WILL TAKE APPROXIMATELY ONE TO 1-1/2 YEARS UNTIL WE ARE ON THE SITE CLEANING UP. A LOT DEPENDS ON THE SELECTED REMEDY AND THE AVAILABILITY OF FUNDS AT THE TIME.

IN YOUR OPINION, WHAT REMEDY DO YOU THINK WILL BE SELECTED? WILL YOU ACT ON BOTH THE SOIL AND THE GROUNDWATER?

WE WILL PROBABLY TAKE ACTION ON BOTH THE SOIL AND THE GROUNDWATER. WE HAVE NOT YET SELECTED A REMEDY, AND MUST CONSIDER THE RECOMMENDATIONS OF THE STATE OF SOUTH CAROLINA, COMMENTS FROM THE PUBLIC, AND THE COMMENTS RECEIVED DURING PEER REVIEW OF OUR ALTERNATIVES.

HOW WOULD LAYMEN HERE KNOW WHAT YOU'RE GOING TO DO IF YOU SET NO GUIDELINES AS TO WHAT YOU'RE GOING TO DO? WE SHOULD TURN THE PROCESS AROUND: WE SHOULD KNOW WHAT YOU ARE GOING TO DO.

THAT IS WHY WE WOULD LIKE TO HEAR WHAT ACTIONS THE PUBLIC THINKS ARE NECESSARY, SO WE CAN USE THAT IN MAKING OUR DECISION.

WHAT EFFECT WOULD OFF-SITE DISPOSAL HAVE ON THE GROUNDWATER? IF YOU DISPOSED OF EVERYTHING AT THE SITE, WHAT EFFECT WOULD IT HAVE ON THE GROUNDWATER?

IF WE TOOK NO ACTION ON THE GROUNDWATER, THE CONTAMINATION WOULD REMAIN ON-SITE, AND WOULD EVENTUALLY MIGRATE OFF-SITE. IT IS POSSIBLE THAT THE LEVELS OF CONTAMINANTS WOULD DECREASE, BUT AT THIS TIME WE DON'T HAVE ENOUGH INFORMATION TO DO ANY MODELING TO PREDICT WHAT THOSE LEVELS MIGHT BE.

IF YOU USED A SLURRY WALL AND CAP, WHAT USE WOULD THAT POSSIBLY BE?

WHEN SELECTING A REMEDIAL ACTION, WE ALSO CONSIDER RESTRICTIONS WHICH WOULD HAVE TO BE PUT ON THE SITE. WITH A SLURRY WALL AND CAP, NO ONE COULD PUT A WELL WITHIN THE SLURRY WALL, AND COULD NOT DIG A TRENCH

ACROSS THE SITE.

IS THERE A POSSIBILITY YOU MAY GO BACK TO HAVE SOMETHING TO COMPARE YOUR

FINDINGS WITH AND TEST SOME WELLS THAT ARE DOWNGRADIENT INSTEAD OF THOSE THAT ARE UPGRADIENT AND MAKE SOME COMPARISON?

IN OUR REMEDIAL DESIGN, WE CAN TEST THOSE DOWNGRADIENT WELLS TO SEE IF THERE HAS BEEN AN EFFECT ON THEM (FROM CONTAMINANTS AT THE SITE).

IS THERE A POSSIBILITY YOU WOULD TEST (THE RESIDENTIAL WELLS DOWNGRADIENT OF THE SITE) IF WE REQUESTED YOU TO DO THAT?

YES, WE WOULD.

WHO SUPERVISES THE CLEAN-UP AND WHO SIGNS THE FINAL "ALL'S CLEAR"?

AFTER REMEDIAL ACTIVITIES ARE COMPLETED, WE WILL PLACE MONITOR WELLS AROUND THE SITE AND MONITOR THE GROUNDWATER FOR THIRTY YEARS. WE WILL HAVE AN EXTENSIVE TECHNICAL REVIEW, BY BOTH THE STATE AND EPA, TO DETERMINE WHETHER OR NOT THE REMEDY IS PERMANENT. (THE ANSWER TO THE QUESTION IS THAT EPA WILL SUPERVISE THE CLEAN-UP AND DELETE THE SITE FROM THE NATIONAL PRIORITIES LIST.).

YOU ARE SAYING IT REQUIRES A SPECIAL GROUP OF PEOPLE TO PERFORM THE CLEAN-UP. I DON'T SEE WHY IT REQUIRES SOMEONE ELSE IN THE MIDDLE WHO SHOULD HAVE SOME MAJOR EXPERTISE IN THAT AREA, IF YOU HAVE DONE THE STUDY AND KNOW WHAT IS THERE.

IT IS NOT KNOWING WHAT IS THERE AS MUCH AS IT IS KNOWING HOW TO CLEAN IT UP. PERSONNEL EXPERIENCED IN HAZARDOUS WASTE REMEDIATION ARE NOT ALWAYS READILY AVAILABLE.

ARE ANY OF THE GROUNDWATER ALTERNATIVES THAT ARE RECOMMENDED ABLE TO RETURN THE GROUNDWATER TO THE CONDITION IT WAS IN BEFORE IT WAS IMPACTED?

THE PUMPING AND TREATING ALTERNATIVE WOULD RETURN THE GROUNDWATER TO BACKGROUND CONTAMINANT LEVELS.

HOW DO YOU GET RID OF LEAD; BY BURNING IT?

LEAD IS VERY DIFFICULT TO GET RID OF. YOU CAN EITHER REMOVE IT OR YOU CAN TREAT IT SO THAT IT DOESN'T GO ANYWHERE, WHICH IS WHAT THE STABILIZATION/SOLIDIFICATION PROCESS DOES.

HOW DO YOU TREAT THE BOTTOM OF THE SOIL?

THE SOILS ARE EXCAVATED, SLURRIED, RUN THROUGH THE STABILIZATION PROCESS, AND PLACED BACK INTO THE PIT.

YOU ARE SAYING THE SOIL CONTAMINATION IS APPROXIMATELY TWO FEET DEEP, WHILE OTHERS ARE SAYING SIX FEET OR DEEPER. YOUR SOIL TEST WENT TWO FEET DEEP, BUT THERE MAY BE CONTAMINATION DEEPER THAN THAT WHICH YOU

HAVEN'T CHECKED OUT.

WE HAD TROUBLE TAKING SAMPLES BELOW TWO FEET BECAUSE THE HOLES TEND TO CAVE IN BELOW THE WATER LEVEL. IF WE SELECT EXCAVATION AS PART OF OUR REMEDY, WE WILL STRIP OFF THE TOP PORTION OF SOIL, THEN TEST THE NEXT LOWER PORTION, AND SO ON UNTIL WE REACH THE POINT WHERE THERE IS NO CONTAMINATION.

WERE THIRTY YEARS OF O&M MONITORING CALCULATED INTO THE PERMANENT ALTERNATIVES?

YES, THE PRESENT WORTH COSTS INCLUDE 30 YEARS OF MONITORING.

3.1.3 COMMENTS ON FEASIBILITY STUDY

THE FEASIBILITY STUDY LEFT OUT ALL THE INFORMATION PERTAINING TO THE TESTING OF THE WELLS. THERE ARE A LOT OF DISCREPANCIES BETWEEN (THE RI AND THE FS). IN THE FS YOU DID NOT SHOW THE INFORMATION ABOUT THE MONITORING WELLS AND THE PRIVATE WELLS THAT YOU DID IN THE COPY WE RECEIVED PRIOR TO THAT.

THE LATEST REPORT YOU RECEIVED WAS THE FS, WHICH DEVELOPED THE REMEDIAL ALTERNATIVES, AND ONLY SUMMARIZED THE RESULTS OF THE RI, WHICH WAS THE FIRST REPORT. YOU MUST LOOK AT BOTH DOCUMENTS.

AS FAR AS WE ARE CONCERNED, THE RI AND FS ARE INCONCLUSIVE. THE REASON WE SAY THAT IS BECAUSE YOU MAKE A STATEMENT, THEN YOU SAY IT MAY BE OR IT COULD BE. THIS MAKES US FEEL LIKE THE WHOLE REPORT IS INCONCLUSIVE, SO WE ARE NOT ABSOLUTELY SATISFIED WITH THE REPORT.

WE DON'T ALWAYS KNOW WHETHER SOMETHING WILL OR WILL NOT HAPPEN, BUT CAN ONLY SPEAK OF THE POSSIBILITIES.

3.1.4 COMMENTS ON ENVIRONMENTAL CONCERNS

WHO OR WHAT ARE YOU CONCERNED ABOUT, (IN SPEAKING ABOUT THE ENVIRONMENTAL EFFECTS OF GROUNDWATER DISCHARGE)? ARE YOU TALKING ABOUT THE SHELLFISH, THE BIRDS, OR THE PEOPLE?

THE SPECIFIC SPECIES ARE THE BALD EAGLE, THE WOOD STORK, AND A SPECIES OF WOODPECKER. (THESE ARE ENDANGERED SPECIES WHICH HAVE EITHER BEEN IDENTIFIED IN OR ARE LIKELY TO INHABIT WETLANDS OF THE WALLACE RIVER, INTO WHICH GROUNDWATER FROM THE SURFICIAL AQUIFER DISCHARGES.).

I THINK THIS IS PROBABLY WHAT UPSETS THESE PEOPLE THE MOST. TRUE, YOU HAVE ENDANGERED SPECIES, BUT WHEN YOU PUT ENDANGERED SPECIES, LIKE BALD-HEADED EAGLES, ABOVE HUMAN LIVES, THESE CHILDREN AND THESE PEOPLE

HAVE TO DRINK THIS WATER, WHICH THEY HAVE BEEN TOLD IS NOT SAFE TO DRINK. THEY HAVE TO HAUL WATER 1500 FEET, AND YOU'RE PUTTING ALL OF THIS AND THEIR NEED FOR A BALD-HEADED EAGLE... I THINK SOMEWHERE THE

HUMAN ELEMENT IS FAR MORE -- YOU'RE TALKING ENDANGERED SPECIES WHEN WE'RE TALKING HUMANS HERE.

WE HAVE TO BE CONCERNED ABOUT BOTH (ENDANGERED SPECIES AND HUMAN LIVES).

WE ARE SITTING HERE AND YOU ARE SAYING "PROTECTING THE ENDANGERED SPECIES;" NOTHING WAS MENTIONED ABOUT THE HUMAN ELEMENT.

WE WERE TALKING ABOUT DRINKING WATER, AND WE WERE TALKING ABOUT HUMANS. ALL THE WHILE WE WERE TALKING ABOUT THE PEOPLE FIRST.

(IF THE GROUNDWATER HAS NOT MOVED FAR ENOUGH TO AFFECT THE WALLACE RIVER AT THIS TIME,) THEN WHY ARE YOU CONCERNED ABOUT THE EAGLES (IN THE WETLANDS OF THE WALLACE RIVER)?

WE ARE CONCERNED ABOUT POSSIBLE CONTAMINATION OF THE WALLACE RIVER WETLANDS IN A FUTURE-USE SCENARIO. WE ARE CONCERNED ALSO ABOUT ANY PRIVATE OR RESIDENTIAL WELLS THAT MAY BE LOCATED ALONG HIGHWAY 17 TO THE WEST OF THE SITE. HOWEVER, RIGHT NOW, UNDER THE CURRENT SITUATION, THERE IS NOT A THREAT TO THE WELLS.

IF YOU ARE SAYING THE CONTAMINATION COULD AFFECT THE BALD EAGLES, THERE IS A POSSIBILITY THERE MIGHT BE SOME DANGER TO THE PEOPLE THAT ARE DRINKING WATER FROM THE WELLS IN THE AREA?

NO. IT MAY AFFECT THE WILDLIFE, BUT A HUMAN COULD COME INTO CONTACT WITH THE SAME AMOUNT AND THERE WOULD BE NO EFFECT (ON THE HUMAN.).

I WASN'T ABLE TO FIND ANY INFORMATION IN THE FEASIBILITY STUDY CONCERNING THE TESTING OF FISH, YET YOU SAID THAT YOU HAD MADE A DETERMINATION ABOUT THE ENVIRONMENT.

WE DID NOT INCLUDE BIOMONITORING IN THE REMEDIAL INVESTIGATION. OUR DETERMINATION IS BASED ON THE LEVELS (OF CONTAMINANTS) THAT ARE THERE NOW, AND FROM PAST STUDIES THAT HAVE BEEN DONE TO DETERMINE WHAT LEVELS WOULD BE DANGEROUS TO THE WILDLIFE.

3.1.5 COMMENTS ON PUBLIC HEALTH CONCERNS

IF YOU DID NOT TEST (THE RESIDENTIAL WELLS), HOW DO YOU KNOW (THEY ARE NOT CONTAMINATED)?

WE KNOW (THEY ARE NOT CONTAMINATED) BY LOOKING AT SOME OF THE HYDRAULIC CHARACTERISTICS OF THE AQUIFER AND DOING A ROUGH ESTIMATE AS TO HOW FAR THE CONTAMINATION WOULD HAVE MOVED IN THE 16 YEARS THAT THE OIL HAS BEEN THERE. IN ADDITION, WE LOOKED (AT CONTAMINATION OF MONITORING WELLS WHICH WE PLACED DOWNGRADIENT OF THE SITE). THESE THINGS LED US TO

BELIEVE THAT AT THIS POINT THERE IS NO (CONTAMINATION) PROBLEM FAR DOWNGRADIENT.

DOES ATSDR EVALUATE THE "SATISFACTORINESS" OF THE SAMPLING THAT WAS DONE, SUCH AS THE LOCATION OF THE WELLS, ETC.?

(ATSDR RESPONSE)
ATSDR IS NOT A "YES" AGENCY TO EPA. AT MANY SITES WHERE THE SAMPLING HAS BEEN TAKEN FROM INAPPROPRIATE LOCATIONS, OR THE SAMPLING WAS INSUFFICIENT TO ENABLE SOME SORT OF A REASONABLY SOUND HEALTH OPINION TO BE RENDERED, ATSDR ADVISES EPA OF THAT, AND SAYS EPA HAS TO GO BACK AND TAKE SOME ADDITIONAL SAMPLES IN THIS AREA.

DOES ATSDR FEEL THE SAMPLING WAS ADEQUATE IN THIS PARTICULAR CIRCUMSTANCE?

(ATSDR RESPONSE)
YES, AT THIS TIME.

IF A SEPARATE STUDY DETERMINED SOMETHING THAT WAS IN CONFLICT WITH THE STUDY THAT'S BEEN DONE, WOULD YOU THEN WANT MORE INFORMATION AND RE-EVALUATE THE CIRCUMSTANCE?

(ATSDR RESPONSE)
IF IT APPEARED TO BE A REASONABLE DISCREPANCY THAT HAS SOME MERIT TO IT, OR IF IT WAS BACKED BY SOME DATA OR INFORMATION THAT WAS BASICALLY SOLID.

WERE ALL OF ATSDR'S CONCLUSIONS BASED ON THE INFORMATION THAT WAS PRESENTED TO YOU BY CAMP, DRESSER, AND MCKEE?

(ATSDR RESPONSE)
ATSDR'S CONCLUSIONS WERE BASED ON INFORMATION DEVELOPED BY CDM THROUGH THE RI/FS PROCESS.

ARE YOU GOING TO SAY A CERTAIN SPOT IS OKAY, BUT ANOTHER SPOT IS NOT OKAY FOR THE RESIDENTS?

(ATSDR RESPONSE)
THAT IS WHY THE (PUBLIC HEALTH) ASSESSMENT DEALS WITH WHAT APPEARS TO BE THE THREAT, IF ANY, TODAY. IF THE RESULTS OF THE INVESTIGATION HAD INDICATED THAT THE DOWNGRADIENT WELLS WERE SIGNIFICANTLY ELEVATED (IN CONTAMINANT LEVELS), AND WE HAD PEOPLE CONSUMING THAT WATER, WE WOULD MOVE IN A MUCH QUICKER TIME FRAME THAN WE ARE NOW.

WHAT WE NEED, AND EPA IS NOT GIVING, IS A COMMITMENT THAT THE DRINKING WATER IS CONTAMINATED. EPA IS MAKING A STATEMENT THAT THERE IS A POSSIBILITY IT COULD BE CONTAMINATED, AND DO NOT DRINK THE WATER.

THE DRINKING WATER COULD POSSIBLY BE CONTAMINATED IN THE FUTURE, IF WE

DON'T CLEAN IT UP NOW.

(DOES YOUR RECORD-OF-DECISION) SAY WHAT DAMAGE THE CONTAMINANTS CAN

CAUSE TO THE BODY?

THAT INFORMATION IS INCLUDED IN THE REMEDIAL INVESTIGATION REPORT.

WHAT WOULD BE THE EFFECT ON HUMAN HEALTH OF ALL OF THESE CONTAMINANTS TOGETHER?

WE DON'T HAVE THE ANSWER TO ALL OF THAT, BUT THE CONCENTRATIONS PRESENT ARE NOT HIGH ENOUGH TO WARRANT ADDITIVE CARCINOGENIC EFFECTS.

(A PARTICIPANT COMMENTED THAT THE WATER WHICH EPA PARTICIPANTS WERE DRINKING CAME FROM A WELL NEAR THE SITE, AND ASKED WHAT THE PEOPLE WHO DRANK IT THOUGHT OF IT.).

(THE WATER WAS SAID TO TASTE NORMAL.).

HOW ABOUT A BABY DRINKING THE WATER (FROM RESIDENTIAL WELLS NEAR THE SITE)?

(ATSDR RESPONSE)
THE DRINKING WATER STANDARDS THAT ARE ESTABLISHED TAKE INTO ACCOUNT, AS MUCH AS IS POSSIBLE, SENSITIVE SPECIES LIKE ELDERLY SPECIES, SINCE IT IS THE SENSITIVE POPULATIONS LIKE CHILDREN AND ELDERLY PERSONS WHO MAY HAVE PROBLEMS AND COULD BE AFFECTED (BY THE CONTAMINANTS).

THERE ARE A LOT OF PEOPLE THAT LIVE IN THE AREA THAT HAVE KIDNEY DISEASE.

(ATSDR RESPONSE)
IN EVERY HEALTHY POPULATION WE HAVE SICKNESS. PEOPLE GET SICK AND THEY DIE, BUT IT'S NOT ALWAYS BECAUSE OF EXPOSURE (TO CHEMICALS).

IF YOU HAD A WELL NEXT TO THIS SITE, WOULD YOU DRINK THE WATER ON A DAILY BASIS?

NOT IMMEDIATELY DOWNGRADIENT OF IT, BUT ALL PRESENT RESIDENTIAL WELLS ARE UNCONTAMINATED.

3.1.6 COMMENTS ON BURIED DRUMS AT THE SITE

(SEVERAL COMMENTS WERE MADE CONCERNING DRUMS BEING BURIED ON THE SITE, BENEATH THE NORTHERN POND. THESE DRUMS REPORTEDLY CONTAIN LEAD, PESTICIDES, AND RADIOACTIVE MATERIAL. SEVERAL CITIZENS FELT THAT THE SITE HAD NOT BEEN ADEQUATELY CHARACTERIZED BECAUSE NO INVESTIGATION HAD BEEN DONE TO DETECT BURIED DRUMS. CITIZENS ALSO FELT THAT EPA SHOULD GO BACK ON-SITE TO TRY TO DETECT BURIED DRUMS.).

WE WILL INITIATE ACTION TO INVESTIGATE BURIED DRUMS ON THE SITE, AND REMOVE THEM IF NECESSARY.

HOW LONG WILL THE DRUM INVESTIGATION TAKE? WE ONLY HAVE THREE WEEKS TO COMMENT ON THE REMEDY.

WE CAN INVESTIGATE THE SITE WITHIN A COUPLE OF DAYS. (PERSONNEL WERE NOT AVAILABLE TO INVESTIGATE THE SITE ON SUCH SHORT NOTICE. THE SITE INVESTIGATION WAS ACTUALLY HELD TWO WEEKS LATER, ON FEBRUARY 12, 1987.

APPENDIX B
LEGAL NOTICES SUMMARIZING
PROPOSED REMEDIAL ALTERNATIVES FOR THE
GEIGER (C&M OIL) SITE

NOTICE OF PUBLIC MEETING AND
SOLICITATION OF COMMENTS ON
GEIGER (C&M OIL) HAZARDOUS WASTE SITE

THE U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA) WILL HOLD A PUBLIC MEETING ON THURSDAY, JANUARY 29, 1987 AT 8:00 P.M. TO DISCUSS PROPOSED REMEDIES FOR SOIL AND GROUNDWATER CONTAMINATION AT THE GEIGER (C&M OIL) NATIONAL PRIORITIES LIST HAZARDOUS WASTE SITE IN CHARLESTON COUNTY, SOUTH CAROLINA. A SUMMARY OF REMEDIAL ALTERNATIVES WILL BE PRESENTED, AND COMMENTS WILL BE SOLICITED FROM CONCERNED CITIZENS. THE MEETING WILL BE HELD AT THE FOLLOWING LOCATION:

HOLLYWOOD CITY HALL
6316 HIGHWAY 162
HOLLYWOOD, SOUTH CAROLINA 29449
(803) 889-3222.

THE DRAFT FEASIBILITY STUDY (FS), DETAILING REMEDIES BEING CONSIDERED BY EPA, MAY BE REVIEWED AT THE HOLLYWOOD CITY HALL. THE PUBLIC MEETING WILL MARK THE START OF A THREE-WEEK PUBLIC COMMENT PERIOD ON THE PROPOSED REMEDIES. THE COMMENT PERIOD WILL BEGIN JANUARY 29, 1987 AND CONCLUDE ON THURSDAY, FEBRUARY 19, 1987. DURING THIS THREE-WEEK PERIOD THE PUBLIC IS ENCOURAGED TO REVIEW THE PROPOSED REMEDIES IN THE FS REPORT AND TO SUBMIT COMMENTS TO EPA.

ALL WRITTEN COMMENTS MUST BE POSTMARKED NO LATER THAN MIDNIGHT, FEBRUARY 19, 1987, AND SHOULD BE SENT TO

THOMAS M. ROTH
REMEDIAL PROJECT MANAGER
U.S. ENVIRONMENTAL PROTECTION AGENCY
345 COURTLAND STREET, NE
ATLANTA, GEORGIA 30365
(404) 347-2643.

THE FEASIBILITY STUDY (FS) EVALUATION RESULTED IN THE DEVELOPMENT OF SEVERAL ALTERNATIVES FOR CLEANING UP SOIL AND GROUNDWATER CONTAMINATION

AT THE GEIGER (C&M OIL) SITE. THE ALTERNATIVES WERE EVALUATED ON HOW EASILY THEY COULD BE IMPLEMENTED, HOW WELL THEY WOULD CLEAN-UP THE ENVIRONMENT AND PROTECT PUBLIC HEALTH, AND HOW COST-EFFECTIVE THEY ARE.

THE FOLLOWING ALTERNATIVES ARE BEING CONSIDERED FOR THE GEIGER SITE:

ALTERNATIVES FOR GROUNDWATER REMEDIATION

A-1 EXTRACTION, AIR STRIPPING, OPTIONAL FLOCCULATION/SEDIMENTATION, AND DISPOSAL OF GROUNDWATER

UNDER THIS ALTERNATIVE, GROUNDWATER WOULD BE PUMPED FROM SEVERAL WELLS ON THE SITE TO THE TOP OF A PORTABLE AIR STRIPPING UNIT. THE WATER WOULD FALL THROUGH THE UNIT, WHILE AIR BLOWN UPWARDS AGAINST THE FLOW WOULD REMOVE VOLATILE ORGANIC COMPOUNDS WHICH CONTAMINATE THE WATER. IF, DURING REMEDIAL DESIGN OF THE ALTERNATIVE, IT IS DETERMINED THAT METALS PRESENT A CONTAMINATION PROBLEM, A FLOCCULATION/SEDIMENTATION SYSTEM WILL ALSO BE USED. LIME WOULD BE ADDED TO THE EXTRACTED GROUNDWATER, CAUSING METALS IN THE WATER TO SETTLE OUT. THE TREATED WATER WOULD BE FILTERED AND THEN DISCHARGED TO THE STREAM WEST OF THE SITE. APPROXIMATELY 62 MILLION GALLONS OF WATER WOULD BE TREATED.

A-2 EXTRACTION, OPTIONAL FLOCCULATION/SEDIMENTATION, CARBON ADSORPTION, AND DISPOSAL OF GROUNDWATER

THIS ALTERNATIVE WOULD INVOLVE PUMPING GROUNDWATER FROM SEVERAL ON-SITE WELLS TO COLUMNS OF GRANULAR ACTIVATED CARBON, WOULD ADSORB ORGANIC CONTAMINANTS IN THE WATER. USED CARBON WOULD BE DISPOSED OFF-SITE IN AN APPROVED LANDFILL. SHOULD METALS BE DETERMINED TO PRESENT A CONTAMINATION PROBLEM, A FLOCCULATION/SEDIMENTATION SYSTEM WOULD ALSO BE USED, AS DESCRIBED ABOVE IN ALTERNATIVE A-1. TREATED WATER WOULD BE DISCHARGED TO THE STREAM WEST OF THE SITE. WITH THIS ALTERNATIVE, APPROXIMATELY 62 MILLION GALLONS OF WATER WOULD BE PUMPED AND TREATED.

A-3 EXTRACTION AND TREATMENT OF GROUNDWATER AT A PRIVATELY-OWNED TREATMENT WORKS

THIS ALTERNATIVE WOULD INVOLVE EXTRACTION OF GROUNDWATER FROM SEVERAL ON-SITE WELLS AND PUMPING IT THROUGH A 4-INCH PIPE ALONG ROUTES 162 AND 17 TO A SEWER LINE ABOUT 6 MILES FROM THE SITE. THE WATER WOULD FLOW IN THE SEWER TO A WATER TREATMENT PLANT.

A-4 SLURRY WALL AND CAP

A TRENCH WOULD BE EXCAVATED TO A DEPTH OF APPROXIMATELY 50 FEET AROUND THE CONTAMINATED AREA. BACK-FILLING THE TRENCH WITH MATERIAL OF LOW PERMEABILITY WOULD PREVENT THE FLOW OF CONTAMINATED GROUNDWATER OUT OF

THE ENCLOSED AREA. A CAP WOULD PREVENT WATER FROM ENTERING THIS AREA FROM THE GROUND SURFACE.

ALTERNATIVES FOR SOIL REMEDIATION

B-1 CAP

A THREE-LAYERED CAP WOULD BE CONSTRUCTED OVER THE AREA OF HIGHEST SOIL CONTAMINATION, AN AREA OF APPROXIMATELY 1.2 ACRES. THIS WOULD PREVENT HUMAN OR ENVIRONMENTAL CONTACT WITH THE SOILS AND WOULD PREVENT THEIR EROSION INTO NEARBY STREAMS AND WETLANDS. INFILTRATION OF WATER FROM THE GROUND SURFACE WOULD ALSO BE RETARDED.

B-2 VEGETATIVE OR GRAVEL COVER

A VEGETATED LAYER OF TOPSOIL OR A LAYER OF GRAVEL WOULD BE PLACED OVER THE MOST-CONTAMINATED AREA, PREVENTING HUMAN AND ENVIRONMENTAL CONTACT WITH CONTAMINATED SOIL. SURFACE WATER WOULD STILL INFILTRATE THE SOILS.

B-3 PARTIAL EXCAVATION, ON-SITE DISPOSAL, AND CAP

SOILS AT LOWER CONTAMINATION WOULD BE PLACED IN THE HIGHLY CONTAMINATED AREA AND A CAP WOULD BE PLACED OVER THEM AS DESCRIBED IN ALTERNATIVE B-1. EXCAVATED AREAS WOULD BE BACKFILLED AND GRADED.

B-4 PARTIAL EXCAVATION, ON-SITE DISPOSAL, AND COVER

LESSER-CONTAMINATED SOILS WOULD BE PLACED IN THE HIGHLY CONTAMINATED AREA AND A VEGETATIVE OR GRAVEL COVER, AS DESCRIBED IN ALTERNATIVE B-2, WOULD BE PLACED OVER THEM.

B-5 EXCAVATION, ON-SITE INCINERATION, AND SOLIDIFICATION/STABILIZATION

ALL CONTAMINATED SOILS ON THE SITE WOULD BE EXCAVATED AND INCINERATED IN A MOBILE INFRARED INCINERATOR TO REMOVE ORGANIC CONTAMINANTS. THESE SOILS WOULD THEN GO THROUGH A STABILIZATION PROCESS, WHICH REDUCES THE MOVEMENT OF METALS FROM THE SOIL INTO THE GROUNDWATER. THE TREATED SOIL WOULD BE PLACED BACK INTO THE EXCAVATED AREA.

B-6 EXCAVATION AND OFF-SITE DISPOSAL

ALL CONTAMINATED SOIL ON THE SITE WOULD BE EXCAVATED AND HAULED TO AN OFF-SITE LANDFILL, APPROVED FOR HANDLING HAZARDOUS WASTES. THE EXCAVATED AREAS WOULD BE BACKFILLED WITH CLEAN LOCAL SOIL.

NO ACTION ALTERNATIVE

NO REMEDIAL ACTION WOULD BE TAKEN AT THE SITE, AND CURRENT CONDITIONS WOULD PERSIST. MONITORING OF GROUNDWATER MAY BE DONE ON A PERIODIC BASIS.

FURTHER INFORMATION CONCERNING THE GEIGER (C&M OIL) SITE MAY BE OBTAINED AT THE PUBLIC INFORMATION REPOSITORY AT THE HOLLYWOOD CITY HALL OR BY

CONTACTING THOMAS ROTH, REMEDIAL PROJECT MANAGER, AT THE ABOVE ADDRESS OR TELEPHONE NUMBER.

THIS NOTICE IS PUBLISHED IN ACCORDANCE WITH SECTION 117 (A) (2) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (CERCLA), AS AMENDED BY THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA).

4WD-ER	4WD-ER	4WD-ER	4WD-ER
ROTH	JENNINGS	WRIGHT	MCCORMICK

ROTH:EBT 1/6/87:DISK ERRB.

APPENDIX C
FACT SHEETS AND PRESS RELEASES
GEIGER (C&M OIL) SITE

ENVIRONMENTAL NEWS

SEPTEMBER 2, 1986

H. MICHAEL HENDERSON
404 - 347 - 3004

PRESS ADVISORY

ATLANTA, GEORGIA - THE U. S. ENVIRONMENTAL PROTECTION AGENCY (EPA) WILL HOLD AN INFORMATIONAL MEETING ON TUESDAY, SEPTEMBER 9, 1986 AT 8 P. M. IN THE HOLLYWOOD TOWN HALL, 6316 HIGHWAY 162, HOLLYWOOD, SOUTH CAROLINA.

THE PURPOSE OF THE MEETING IS TO PRESENT THE SUMMARY RESULTS OF THE REMEDIAL INVESTIGATION STUDY (RI) FOR THE GEIGER (C & M OIL) SITE WHICH IS LOCATED IN HOLLYWOOD, CHARLESTON COUNTY, SOUTH CAROLINA. THE RI INCLUDED THE DRILLING OF TEMPORARY WELLS BELOW THE GROUNDWATER TABLE, INSTALLATION OF PERMANENT MONITORING WELLS, SAMPLING OF LOCAL RESIDENTIAL WELLS AND SAMPLING OF GROUNDWATER. IT ALSO INCLUDED SAMPLING OF SOIL AND SURFACE WATER, BOTH ON AND OFF THE SITE.

THERE WILL BE AN OPPORTUNITY FOR CITIZENS TO ASK QUESTIONS DURING THE TWO HOUR PRESENTATION.

INFORMATION CONCERNING SITE ACTIVITIES FOR THE GEIGER (C & M OIL) SUPERFUND SITE IS CURRENTLY AVAILABLE FOR CITIZEN REVIEW AT THE HOLLYWOOD TOWN HALL.

THE GEIGER (C & M OIL) SITE IS BEING CONSIDERED FOR LONG-TERM CLEANUP UNDER SUPERFUND WHICH IS A NATIONAL TRUST FUND ESTABLISHED BY CONGRESS TO DEAL WITH MAJOR ENVIRONMENTAL PROBLEMS AND IS AUTHORIZED BY

THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (CERCLA). THE SUPERFUND PROGRAM IS MANAGED BY THE U. S. ENVIRONMENTAL PROTECTION AGENCY.

ENVIRONMENTAL NEWS

JANUARY 16, 1987

H. MICHAEL HENDERSON

PRESS ADVISORY

ATLANTA, GEORGIA - THE U. S. ENVIRONMENTAL PROTECTION AGENCY (EPA) WILL HOLD A SUPERFUND PUBLIC MEETING ON THURSDAY, JANUARY 29, 1987 AT 8:00 P. M. AT THE HOLLYWOOD CITY HALL, 6316 HIGHWAY 162, HOLLYWOOD, SOUTH CAROLINA.

EPA OFFICIALS WILL DISCUSS THE PROPOSED REMEDIES FOR SOIL AND GROUNDWATER CONTAMINATION AT THE GEIGER (C&M OIL) NATIONAL PRIORITIES LIST (NPL) HAZARDOUS WASTE SITE. A SUMMARY OF REMEDIAL ALTERNATIVES WILL BE PRESENTED AND COMMENTS WILL BE SOLICITED FROM CONCERNED CITIZENS.

THE DRAFT FEASIBILITY STUDY (FS) DETAILING REMEDIES BEING CONSIDERED BY EPA MAY BE REVIEWED AT THE HOLLYWOOD CITY HALL.

THE PUBLIC MEETING WILL MARK THE START OF A THREE-WEEK PUBLIC COMMENT PERIOD ON THE PROPOSED REMEDIES. THIS COMMENT PERIOD WILL BEGIN JANUARY 29, 1987 AND CONCLUDE ON THURSDAY, FEBRUARY 19, 1987. DURING THIS THREE-WEEK PERIOD THE PUBLIC IS ENCOURAGED TO REVIEW THE PROPOSED REMEDIES IN THE FS REPORT AND TO SUBMIT WRITTEN COMMENTS TO EPA.

ALL WRITTEN COMMENTS MUST BE POSTMARKED NO LATER THAN MIDNIGHT, FEBRUARY 19, 1987 AND SHOULD BE SENT TO:

THOMAS M. ROTH
REMEDIAL PROJECT MANAGER
U. S. ENVIRONMENTAL PROTECTION AGENCY
345 COURTLAND STREET, N. E.
ATLANTA, GEORGIA 30365
(404) 347-2643.

THE RECENTLY REENACTED SUPERFUND PROGRAM IS DESIGNED TO PROTECT HUMAN HEALTH AND THE ENVIRONMENT BY PROVIDING MONEY FOR THE CLEANUP OF ABANDONED HAZARDOUS WASTE SITES AND SPILLS OF

HAZARDOUS SUBSTANCES.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV

PREPARED BY: H.M. HENDERSON
PUBLIC AFFAIRS
(404) 881 - 3004

FACT SHEET
FOR
GEIGER (C & M) OIL SITE
CHARLESTON COUNTY, SOUTH CAROLINA

JUNE 26,1985

AS A PART OF A REMEDIAL INVESTIGATION, A CONTRACTOR UNDER CONTRACT TO THE U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA) WILL BE INITIATING EFFORTS TO DETERMINE THE NATURE AND EXTENT OF ANY CONTAMINATION RESULTING FROM PAST ACTIVITIES AT THE GEIGER (C & M) OIL SITE IN RANTOWLES, SOUTH CAROLINA. THESE EFFORTS WILL START AROUND JULY 8, 1985 AND WILL CONTINUE FOR APPROXIMATELY TWO (02) MONTHS. SOIL, SEDIMENT, SURFACE WATER, AND GROUNDWATER SAMPLES WILL BE COLLECTED AND ANALYZED FOR HAZARDOUS CONTAMINANTS. THE RESULTS WILL BE INCORPORATED INTO A FEASIBILITY STUDY (FS). THE FEASIBILITY STUDY WILL BE PRESENTED TO THE PUBLIC IN A PUBLIC MEETING UPON COMPLETION.

UNDER THE SUPERFUND PROGRAM, A REMEDIAL INVESTIGATION (RI) IS A FIELD EFFORT TO DETERMINE THE NATURE AND EXTENT OF THE PROBLEM AT THE SITE, TO DEVELOP VIABLE REMEDIAL RESPONSE ALTERNATIVES, AND GATHER ALL NECESSARY DATA TO EVALUATE THE REMEDIAL ALTERNATIVES AND SUPPORT THE SELECTION OF A REMEDIAL RESPONSE IN THE FEASIBILITY STUDY. THE FEASIBILITY STUDY EVALUATES ALTERNATIVE REMEDIAL RESPONSES BASED ON COST, ENGINEERING FEASIBILITY, AND ENVIRONMENTAL IMPACT. IT RECOMMENDS THE MOST COST-EFFECTIVE SOLUTION THAT WILL ADEQUATELY PROTECT PUBLIC HEALTH, WELFARE, AND THE ENVIRONMENT.

SEVERAL RESIDENTIAL WELLS ARE SCHEDULED TO BE SAMPLED AS PART OF THE REMEDIAL INVESTIGATION. THOSE RESIDENTS WHOSE WELLS ARE TO BE SAMPLED WILL BE CONTACTED. THE PURPOSE OF THIS SAMPLING IS TO CONFIRM THE ANALYSIS OF SAMPLES PREVIOUSLY COLLECTED BY THE SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL. RESIDENTS IN THE AREA OF THE SITE SHOULD BE AWARE THAT THE DRILLING AND COLLECTION OF SAMPLES MAY REQUIRE INCREASED TRAFFIC IN THE AREA.

THE GEIGER (C & M) OIL SITE OCCUPIES APPROXIMATELY FIVE ACRES IN THE COMMUNITY OF RANTOWLES. RANTOWLES IS LOCATED APPROXIMATELY TWELVE (12) MILES WEST OF DOWNTOWN CHARLESTON.

THE SITE, UNDER PREVIOUS OWNERS, HAS BEEN THE OBJECT OF CONCERN BY THE SOUTH CAROLINA POLLUTION CONTROL AUTHORITY AND THE CHARLESTON COUNTY HEALTH DEPARTMENT SINCE 1970. IT WAS ADDED TO THE NATIONAL PRIORITY LIST (NPL) IN 1983 AND IS SCHEDULED FOR LONG TERM REMEDIAL ACTIVITY OVER THE NEXT SEVERAL YEARS.

FOR MORE INFORMATION:

JEFF PIERCE
REMEDIAL PROJECT MANAGER
REMEDIAL ACTION SECTION
U.S. EPA - REGION IV
345 COURTLAND STREET N.E.
ATLANTA, GEORGIA 30365
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CHRIS STATON
S.C. DHEC
2600 BULL STREET
COLUMBIA, S.C. 29201
(803) 758 - 5681

HMH:HMH.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV

REMEDIAL INVESTIGATION SUMMARY
FOR GEIGER (C&M OIL) SITE
HOLLYWOOD, CHARLESTON COUNTY, SOUTH CAROLINA

SEPTEMBER 1986

INTRODUCTION

THE U. S. ENVIRONMENTAL PROTECTION AGENCY (EPA) RECENTLY COMPLETED A REMEDIAL INVESTIGATION (RI) TO EVALUATE CONDITIONS AT THE GEIGER SUPERFUND SITE NEAR RANTOWLES, SOUTH CAROLINA. THIS FACT SHEET PROVIDES BACKGROUND INFORMATION ON THE SITE AND SUMMARIZES THE FINDINGS OF THE RI REPORT.

SITE HISTORY

THE GEIGER (C & M OIL) SITE IS A FIVE ACRE AREA LOCATED APPROXIMATELY 1 MILE SOUTHWEST OF RANTOWLES, SOUTH CAROLINA. A SERIES OF EIGHT IRREGULARLY SHAPED WASTE OIL LAGOONS WERE CONSTRUCTED ON THE SITE SOMETIME BETWEEN 1969 AND 1971. THE LAGOONS WERE APPROXIMATELY ONE FOOT DEEP. THE LAGOONS WERE CONSTRUCTED AND MODIFIED BY VARIOUS OWNERS AS PART OF SEVERAL ATTEMPTS TO DISPOSE OF, OR RECOVER, WASTE OIL. THE BOTTOM OF THESE LAGOONS WAS IN, OR NEAR, THE GROUNDWATER. WITHIN THE LAST SEVERAL YEARS, THE CURRENT OWNER, MR. GEORGE GEIGER, FILLED THE

STORAGE LAGOONS TO ALLOW THE SITE TO BE USED TO STORE CONSTRUCTION EQUIPMENT BELONGING TO HIS COMPANY, PILE DRIVERS, INC. THE SOILS IN THE FILLED AREA ARE NOTICEABLY BLACK. ONE PIT APPROXIMATELY 10 FT. BY 10

FT. BY 2 FT., CONTAINING AN OILY LIQUID WAS FOUND AT THE EASTERN END OF THE FILLED AREA DURING A SITE VISIT IN DECEMBER 1984. NO WASTE OIL OR RECOVERY OPERATIONS ARE KNOWN TO HAVE OCCURRED AT THE SITE SINCE AT LEAST 1980.

IN 1980, THE SURVEILLANCE AND ANALYSIS DIVISION OF U.S. EPA REGION IV CONDUCTED AN INVESTIGATION OF THE SITE. THE ANALYSIS OF THE WASTE OIL RESIDUES IN THE LAGOONS INDICATED THAT THEY ARE SIMILAR TO THOSE ASSOCIATED WITH AUTOMOTIVE CRANKCASES, BRAKE FLUIDS AND DEGREASING COMPOUNDS. TRACE AMOUNTS OF PCB'S AND SMALL AMOUNTS OF ORGANIC SOLVENTS WERE DETECTED. ALSO FOUND WERE ELEVATED LEVELS OF METALS OFTEN ASSOCIATED WITH AUTOMOTIVE OILS. THE U. S. EPA ESTIMATED THE WASTE QUANTITY IN EACH LAGOON AT 18,700 GALLONS (374 DRUMS) OR A TOTAL OF 149,600 GALLONS (2992 DRUMS) ON THE SITE. THE SITE WAS ADDED TO THE NATIONAL PRIORITY LIST (NPL) IN 1983 AND IS SCHEDULED FOR LONG TERM REMEDIAL ACTIVITY OVER THE NEXT SEVERAL YEARS.

REMEDIAL INVESTIGATION RESULTS

EPA CONTRACTED CAMP, DRESSER & MCKEE, INC. TO PERFORM AN EXTENSIVE STUDY OF THE GEIGER SITE. THIS STUDY INCLUDED THE DRILLING OF TEMPORARY WELLS BELOW THE GROUNDWATER TABLE, INSTALLATION OF PERMANENT MONITORING WELLS, SAMPLING OF LOCAL RESIDENTIAL WELLS AND SAMPLING OF GROUNDWATER, SOIL, AND SURFACE WATER, BOTH ON AND OFF THE SITE.

THE RESULTS OF THE REMEDIAL INVESTIGATION INDICATE THAT SOIL ON THE SITE IS CONTAMINATED WITH LEAD, CHROMIUM, MERCURY, PCB, AND SEVERAL ORGANIC COMPOUNDS ABOVE BACKGROUND LEVELS. HOWEVER, NO CONTAMINANTS HAVE MOVED OFF THE SITE, AND THERE IS NO DANGER TO THE PUBLIC FROM EXPOSURE TO CONTAMINATED SOIL.

GROUNDWATER AT THE SITE CONTAINS ARSENIC, LEAD, CADMIUM, AND SEVERAL ORGANIC COMPOUNDS AT CONCENTRATIONS ABOVE THE DRINKING WATER STANDARDS. CONTAMINATED GROUNDWATER HAS NOT MOVED OFF THE SITE. THE VELOCITY OF GROUNDWATER FLOW IS VERY SLOW AND CONTAMINATION WILL REMAIN WITHIN THE GEIGER BOUNDARIES FOR A VERY LONG PERIOD OF TIME. GROUNDWATER FLOWS AWAY FROM RESIDENTIAL WELLS, SO NO HAZARD IS POSED TO DRINKING WATER SUPPLIES. RESIDENTIAL WELLS HAVE BEEN SAMPLED AND NO CONTAMINANTS WERE DETECTED.

CURRENT ACTIVITIES

THE REMEDIAL INVESTIGATION WAS COMPLETED ON JULY 1, 1986 AND THE AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR) IS CURRENTLY REVIEWING THE PUBLIC HEALTH EVALUATION. THE FEASIBILITY STUDY (FS) IS NOW BEING PREPARED. THE FS IS SCHEDULED FOR COMPLETION IN EARLY 1987.

FUTURE ACTIVITIES

EPA IS EXAMINING A WIDE RANGE OF TECHNOLOGIES AS A PART OF THE FEASIBILITY STUDY TO DETERMINE WHICH ONES WILL OFFER THE GREATEST DEGREE OF CLEANUP AT THE GEIGER SITE, WHILE STILL BEING COST-EFFECTIVE AND TECHNICALLY VIABLE. THIS PROCESS WILL ENABLE EPA TO DEVELOP SEVERAL REMEDIAL ALTERNATIVES. THE PUBLIC WILL BE INVITED TO COMMENT ON THESE ALTERNATIVES BEFORE A FINAL DECISION IS MADE.

INFORMATION CONTACTS

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MICHAEL HENDERSON
SUPERFUND COMMUNITY
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV

NOTICE OF PUBLIC MEETING

A PUBLIC MEETING WILL BE HELD ON THE EVENING OF THURSDAY, JANUARY 29, 1987 TO PRESENT A SUMMARY OF THE FEASIBILITY STUDY OF THE GEIGER (C&M OIL) HAZARDOUS WASTE SITE. PROPOSED REMEDIES FOR CONTAMINATION AT THE SITE WILL BE PRESENTED, AND THE PUBLIC WILL HAVE THE OPPORTUNITY TO COMMENT.

THIS MEETING WILL BE HELD AT THE HOLLYWOOD CITY HALL, 6316 HIGHWAY 162, HOLLYWOOD, SC 29449, AND WILL BEGIN AT 8:00 PM.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV

FEASIBILITY STUDY SUMMARY
GEIGER (C&M OIL) SITE
CHARLESTON COUNTY, SOUTH CAROLINA

JANUARY 1987

INTRODUCTION

THE U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA) RECENTLY COMPLETED A FEASIBILITY STUDY (FS) EVALUATING REMEDIAL ALTERNATIVES FOR THE GEIGER (C&M OIL) SUPERFUND HAZARDOUS WASTE SITE IN CHARLESTON COUNTY, SOUTH CAROLINA. THIS FACT SHEET PROVIDES BACKGROUND INFORMATION ON THE SITE AND SUMMARIZES THE DRAFT FS REPORT.

AT SITES LIKE GEIGER (C&M OIL), EPA TYPICALLY CONDUCTS AN EXTENSIVE INVESTIGATION AND STUDY CALLED A REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (RI/FS). (A DETAILED DESCRIPTION OF THE SUPERFUND CLEAN-UP PROCESS IS INCLUDED HERE AS EXHIBIT A.). THE FIRST PART OF THE STUDY, THE RI, DEFINES THE TYPE AND EXTENT OF CONTAMINATION. THE SECOND PART, THE FS, EVALUATES THE CLEAN-UP ALTERNATIVES. THE OBJECTIVES OF CLEAN-UP OF SUPERFUND SITES ARE TO: (1) CONTROL OR ELIMINATE THE SOURCE OF CONTAMINATION, AND (2) MINIMIZE THE THREAT OF HARM TO HUMAN HEALTH AND THE ENVIRONMENT.

SITE BACKGROUND

THE GEIGER (C&M OIL) SITE IS A FIVE-ACRE AREA LOCATED APPROXIMATELY ONE MILE SOUTHWEST OF HOLLYWOOD, SOUTH CAROLINA, IN CENTRAL CHARLESTON COUNTY. SOMETIME BETWEEN 1969 AND 1971, SEVERAL LAGOONS WERE CONSTRUCTED ON THE SITE FOR USE IN WASTE OIL RECOVERY OPERATIONS. THESE LAGOONS WERE UNLINED, ABOUT ONE FOOT DEEP, AND COVERED A TOTAL AREA 50 FEET WIDE BY 1000 FEET LONG. THE LAGOONS, FILLED WITH WASTE OIL, WERE ABANDONED AND LATER FILLED WITH SOIL AND GRADED.

THE SITE WAS PLACED ON THE NATIONAL PRIORITIES LIST, A LIST OF THE NATION'S WORST HAZARDOUS WASTE SITES, ON SEPTEMBER 21, 1984. IN OCTOBER OF 1984, EPA ISSUED A WORK ASSIGNMENT TO CAMP, DRESSER & MCKEE, INC. TO PERFORM A REMEDIAL INVESTIGATION AND FEASIBILITY STUDY OF THE SITE. THE REMEDIAL INVESTIGATION INCLUDED THE DRILLING OF WELLS AND SAMPLING OF GROUNDWATER, AND SAMPLING OF SOILS AND SURFACE WATER BOTH ON AND OFF THE SITE. THE RESULTS OF THE RI SHOW THAT SOIL ON THE SITE IS CONTAMINATED WITH LEAD, MERCURY, CHROMIUM, AND VARIOUS ORGANIC COMPOUNDS ASSOCIATED WITH WASTE OIL. GROUNDWATER AT THE SITE IS ALSO CONTAMINATED, BUT PRESENTS NO THREAT TO NEARBY USERS OF RESIDENTIAL WELLS.

NO RISK TO HUMAN HEALTH IS POSED UNDER CURRENT USE OF THE SITE; HOWEVER, GROUNDWATER MAY MIGRATE OFF-SITE TO SENSITIVE WETLAND AREAS, AND SURFACE CONTAMINANTS MAY RUN-OFF INTO THESE AREAS IF THE SITE IS NOT CLEANED UP. VARIOUS ENDANGERED SPECIES, INCLUDING THE BALD EAGLE, USE THESE WETLANDS AS A FEEDING AREA.

FEASIBILITY STUDY RESULTS

EPA CONDUCTED A FEASIBILITY STUDY (FS) TO EVALUATE VARIOUS WAYS TO CLEAN

UP THE GEIGER (C&M OIL) SITE. THE ALTERNATIVES WERE EVALUATED BASED UPON HOW EASILY THEY COULD BE IMPLEMENTED, HOW WELL THEY WOULD CLEAN-UP THE ENVIRONMENT AND PROTECT PUBLIC HEALTH, AND HOW COST-EFFECTIVE THEY

WOULD BE.

THIS EVALUATION RESULTED IN THE DEVELOPMENT OF SEVERAL ALTERNATIVES FOR CLEANING UP SOIL AND GROUNDWATER CONTAMINATION. THESE ALTERNATIVES ARE DESCRIBED BELOW.

ALTERNATIVES FOR GROUNDWATER REMEDIATION

A-1 EXTRACTION, AIR STRIPPING, OPTIONAL FLOCCULATION/SEDIMENTATION, AND DISPOSAL OF GROUNDWATER

UNDER THIS ALTERNATIVE, GROUNDWATER WOULD BE PUMPED FROM SEVERAL WELLS ON THE SITE TO THE TOP OF A PORTABLE AIR STRIPPING UNIT. THE WATER WOULD FALL THROUGH THE UNIT, WHILE AIR BLOWN UPWARDS AGAINST THE FLOW WOULD REMOVE VOLATILE ORGANIC COMPOUNDS WHICH CONTAMINATE THE WATER. IF, DURING REMEDIAL DESIGN OF THE ALTERNATIVE, IT IS DETERMINED THAT METALS PRESENT A CONTAMINATION PROBLEM, A FLOCCULATION/SEDIMENTATION SYSTEM WILL ALSO BE USED. LIME WOULD BE ADDED TO THE EXTRACTED GROUNDWATER, CAUSING METALS IN THE WATER TO SETTLE OUT. THE TREATED WATER WOULD BE FILTERED AND THEN DISCHARGED TO THE STREAM WEST OF THE SITE. APPROXIMATELY 62 MILLION GALLONS OF WATER WOULD BE TREATED.
ESTIMATED COST: $1.73 MILLION.

A-2 EXTRACTION, OPTIONAL FLOCCULATION/SEDIMENTATION, CARBON ADSORPTION, AND DISPOSAL OF GROUNDWATER

THIS ALTERNATIVE WOULD INVOLVE PUMPING GROUNDWATER FROM SEVERAL ON-SITE WELLS TO COLUMNS OF GRANULAR ACTIVATED CARBON, WHICH WOULD ADSORB ORGANIC CONTAMINANTS IN THE WATER. USED CARBON WOULD BE DISPOSED OFF-SITE IN AN APPROVED LANDFILL. SHOULD METALS BE DETERMINED TO PRESENT A CONTAMINATION PROBLEM, A FLOCCULATION/SEDIMENTATION SYSTEM WOULD ALSO BE USED, AS DESCRIBED ABOVE IN ALTERNATIVE A-1. TREATED WATER WOULD BE DISCHARGED TO THE STREAM WEST OF THE SITE. WITH THIS ALTERNATIVE, APPROXIMATELY 62 MILLION GALLONS OF WATER WOULD BE PUMPED AND TREATED.
ESTIMATED COST: $2.5 MILLION.

A-3 EXTRACTION AND TREATMENT OF GROUNDWATER AT A PRIVATELY-OWNED TREATMENT WORKS

THIS ALTERNATIVE WOULD INVOLVE EXTRACTION OF GROUNDWATER FROM SEVERAL ON-SITE WELLS AND PUMPING IT THROUGH A 4-INCH PIPE ALONG ROUTES 162 AND 17 TO A SEWER LINE ABOUT 6 MILES FROM THE SITE. THE WATER WOULD FLOW IN THE SEWER TO A WATER TREATMENT PLANT.
ESTIMATED COST: $1.5 MILLION.

A-4 SLURRY WALL AND CAP

A TRENCH WOULD BE EXCAVATED TO A DEPTH OF APPROXIMATELY 50 FEET AROUND THE CONTAMINATED AREA. BACK-FILLING THE TRENCH WITH MATERIAL OF LOW

PERMEABILITY WOULD PREVENT THE FLOW OF CONTAMINATED GROUNDWATER OUT OF THE ENCLOSED AREA. A CAP WOULD PREVENT WATER FROM ENTERING THIS AREA FROM THE GROUND SURFACE.
ESTIMATED COST: $4.95 MILLION.

ALTERNATIVES FOR SOIL REMEDIATION

B-1 CAP

A THREE-LAYERED CAP WOULD BE CONSTRUCTED OVER THE AREA OF HIGHEST SOIL CONTAMINATION, AN AREA OF APPROXIMATELY 1.2 ACRES. THIS WOULD PREVENT HUMAN OR ENVIRONMENTAL CONTACT WITH THE SOILS AND WOULD PREVENT THEIR EROSION INTO NEARBY STREAMS AND WETLANDS. INFILTRATION OF WATER FROM THE GROUND SURFACE WOULD ALSO BE RETARDED.
ESTIMATED COST: $972,000.

B-2 VEGETATIVE OR GRAVEL COVER

A VEGETATED LAYER OF TOPSOIL OR A LAYER OF GRAVEL WOULD BE PLACED OVER THE MOST-CONTAMINATED AREA, PREVENTING HUMAN AND ENVIRONMENTAL CONTACT WITH CONTAMINATED SOIL. SURFACE WATER WOULD STILL INFILTRATE THE SOILS.
ESTIMATED COST: $619,000 - $653,000.

B-3 PARTIAL EXCAVATION, ON-SITE DISPOSAL, AND CAP

SOILS OF LOWER CONTAMINATION WOULD BE PLACED IN THE HIGHLY CONTAMINATED AREA AND A CAP WOULD BE PLACED OVER THEM AS DESCRIBED IN ALTERNATIVE B-1. EXCAVATED AREAS WOULD BE BACKFILLED AND GRADED.
ESTIMATED COST: $1.02 MILLION.

B-4 PARTIAL EXCAVATION, ON-SITE DISPOSAL, AND COVER

LESSER-CONTAMINATED SOILS WOULD BE PLACED IN THE HIGHLY CONTAMINATED AREA AND A VEGETATIVE OR GRAVEL COVER, AS DESCRIBED IN ALTERNATIVE B-2, WOULD BE PLACED OVER THEM.
ESTIMATED COST: $666,000 - $710,000.

B-5 EXCAVATION, ON-SITE INCINERATION, AND SOLIDIFICATION/STABILIZATION

ALL CONTAMINATED SOILS ON THE SITE WOULD BE EXCAVATED AND INCINERATED IN A MOBILE INFRARED INCINERATOR TO REMOVE ORGANIC CONTAMINANTS. THESE SOILS WOULD THEN GO THROUGH A STABILIZATION PROCESS, WHICH PREVENTS THE MOVEMENT OF METALS FROM THE SOIL INTO THE GROUNDWATER. THE TREATED SOIL WOULD BE PLACED BACK INTO THE EXCAVATED AREA.
ESTIMATED COST: $5.56 MILLION.

B-6 EXCAVATION AND OFF-SITE DISPOSAL

ALL CONTAMINATED SOIL ON THE SITE WOULD BE EXCAVATED AND HAULED TO AN OFF-SITE LANDFILL, APPROVED FOR HANDLING HAZARDOUS WASTES. THE

EXCAVATED AREAS WOULD BE BACK-FILLED WITH CLEAN LOCAL SOIL.
ESTIMATED COST: $4.28 MILLION.

NO ACTION ALTERNATIVE

NO REMEDIAL ACTION WOULD BE TAKEN AT THE SITE, AND CURRENT CONDITIONS WOULD PERSIST. MONITORING OF GROUNDWATER MAY BE DONE ON A PERIODIC BASIS.

NEXT STEPS

A PUBLIC COMMENT PERIOD, AS DESCRIBED BELOW, WILL BE HELD TO ALLOW CITIZENS TO COMMENT ON THE REMEDIAL ALTERNATIVES CONSIDERED IN THE FEASIBILITY STUDY. FOLLOWING THE CONCLUSION OF THE COMMENT PERIOD ON THE STUDY, A FORMAL DECISION DOCUMENT WILL BE OPERATED THAT SUMMARIZES THE DECISION PROCESS AND THE SELECTED REMEDIES.

THIS DOCUMENT WILL INCLUDE THE RESPONSIVENESS SUMMARY (A REPORT THAT SUMMARIZES CITIZEN COMMENTS AND EPA RESPONSES) AND WILL BE SUBMITTED TO THE EPA REGIONAL ADMINISTRATOR FOR HIS APPROVAL. SUBMISSION OF THIS DECISION DOCUMENT IS EXPECTED TO OCCUR IN MARCH, 1987. AT THAT TIME, THE DESIGN OF THE REMEDY WILL BE DEVELOPED. UPON COMPLETION OF THE DESIGN, IMPLEMENTATION OF THE REMEDY WILL BEGIN. COPIES OF THE DRAFT FS REPORT AND THE RI REPORT ARE AVAILABLE FOR REVIEW AT THE INFORMATION REPOSITORY AT THE FOLLOWING LOCATION:

HOLLYWOOD CITY HALL
6316 HIGHWAY 162
HOLLYWOOD, SOUTH CAROLINA 29449

(803) 889-3222.

WHEN COMPLETED, THE RESPONSIVENESS SUMMARY WILL ALSO BE PLACED ON FILE AT THE INFORMATION REPOSITORY.

PUBLIC COMMENT INVITED

EPA WILL HOLD A PUBLIC MEETING ON THURSDAY, JANUARY 29, 1987 FROM 8 P.M. TO 10 P.M. AT THE HOLLYWOOD CITY HALL, LOCATED AT 6316 HIGHWAY 162, HOLLYWOOD. AT THE MEETING EPA WILL PRESENT A SUMMARY OF THE RI/FS PROCESS (INCLUDING THE RESULTS OF THE FS) AND EXPLAIN THE PROPOSED REMEDIES FOR THE SITE. THERE WILL ALSO BE AN OPPORTUNITY FOR CITIZENS TO ASK QUESTIONS.

THE PUBLIC MEETING WILL MARK THE START OF A THREE-WEEK PUBLIC COMMENT PERIOD ON THE DRAFT FS REPORT. THE COMMENT PERIOD WILL BEGIN JANUARY 29, 1987 AND CONCLUDE ON FEBRUARY 19, 1987. DURING THIS THREE-WEEK

PERIOD, THE PUBLIC IS ENCOURAGED TO REVIEW THE REMEDIES PROPOSED IN THE DRAFT FS REPORT AND SUBMIT WRITTEN COMMENTS TO EPA. COPIES OF THE DRAFT FS REPORT ARE AVAILABLE AT THE INFORMATION REPOSITORY. ALL COMMENTS

MUST BE POST-MARKED NO LATER THAN FEBRUARY 19, 1987 AND SHOULD BE SENT TO:

THOMAS ROTH
REMEDIAL PROJECT MANAGER
U.S. ENVIRONMENTAL PROTECTION AGENCY
345 COURTLAND STREET, NE
ATLANTA, GEORGIA 30365

(404) 347-2643.

FOR QUESTIONS OR FURTHER INFORMATION CONTACT EITHER OF THE FOLLOWING:

THOMAS ROTH
REMEDIAL PROJECT MANAGER
U.S. ENVIRONMENTAL PROTECTION AGENCY
345 COURTLAND STREET, NE
ATLANTA, GEORGIA 30365
(404) 347-2643

MICHAEL HENDERSON
COMMUNITY RELATIONS COORDINATOR
OFFICE OF PUBLIC AFFAIRS
U.S. ENVIRONMENTAL PROTECTION AGENCY
345 COURTLAND STREET, NE
ATLANTA, GEORGIA 30365
(404) 347-3004.

APPENDIX D
COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD AND EPA RESPONSES

CONGRESS OF THE UNITED STATES

FEBRUARY 17, 1987

MR. THOMAS ROTH
REMEDIAL PROJECT MANAGER
U. S. EPA
345 COURTLAND STREET, NE
ATLANTA, GEORGIA 30365

DEAR MR. ROTH,

MY STAFF MEMBER, DANA BEACH, ATTENDED THE MOST RECENT PUBLIC HEARING ON THE PROPOSED CLEANING OF THE TOXIC WASTE SITE NEAR HOLLYWOOD, S. C. I AM CONCERNED THAT NO WELL MONITORING WAS DONE DOWN GRADIENT OF THE CONTAMINATION. I ALSO UNDERSTAND FROM MAYOR DICKERSON THAT NO SIGNS HAVE BEEN POSTED IDENTIFYING THE SITE AS CONTAMINATED. SINCE THE ORIGINAL WELL MONITORING DONE BY DHEC

1

DISCOVERED TRACE AMOUNTS OF HYDROCARBONS, I WOULD RECOMMEND THAT MORE COMPREHENSIVE TESTING BE CONDUCTED TO ASSURE RESIDENTS SAFE DRINKING WATER. UNLESS THE RESIDENTS CAN BE GUARANTEED THAT THEIR WATER IS

SAFE NOW, AND WILL BE SAFE IN THE FUTURE AS NEW WELLS BECOME NECESSARY, IT WOULD SEEM PRUDENT TO PROVIDE MUNICIPAL WATER TO THE IMMEDIATE AREA. PLEASE KEEP ME INFORMED AS TO THE PROGRESS OF THIS SITUATION. THANK YOU.

WITH EVERY GOOD WISH,

ARTHUR RAVENEL, JR.

AR/DB

CC: MAYOR LELA W. DICKERSON.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV

FEB 26 1987

REF: 4WD-ER

HONORABLE ARTHUR RAVENEL, JR.
HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

DEAR MR. RAVENEL:

THIS IS IN RESPONSE TO YOUR LETTER OF FEBRUARY 17, 1987, TO MY STAFF MEMBER THOMAS ROTH, REGARDING THE GEIGER (C&M OIL) HAZARDOUS WASTE SITE NEAR HOLLYWOOD, SOUTH CAROLINA. IN YOUR LETTER, YOU STATED YOUR CONCERNS ABOUT THE SITE: 1) NO WELLS WERE SAMPLED DOWNGRADIENT OF THE SITE; 2) NO SIGNS HAVE BEEN POSTED TO IDENTITY THE SITE AS BEING CONTAMINATED; 3) MORE COMPREHENSIVE TESTING OF RESIDENTIAL WATER SUPPLIES SHOULD BE CONDUCTED; AND 4) MUNICIPAL WATER SHOULD BE SUPPLIED TO THE IMMEDIATE AREA, UNLESS THE RESIDENTS CAN BE ASSURED THAT THEIR DRINKING WATER IS NOT ENDANGERED. I WOULD LIKE TO RESPOND TO EACH OF THESE CONCERNS INDIVIDUALLY.

1) WE DO NOT FEEL THAT SAMPLING OF RESIDENTIAL WELLS DOWNGRADIENT OF THE GEIGER SITE IS WARRANTED AT THIS TIME; HOWEVER, SAMPLING OF SELECTED WELLS WILL BE PERFORMED AS PART OF THE REMEDIAL DESIGN ACTIVITIES, AND DURING LONG-TERM MONITORING FOLLOWING COMPLETION OF OUR REMEDIAL ACTION.

GROUNDWATER MONITORING WELLS WERE PLACED DOWNGRADIENT OF THE SITE AT POINTS BETWEEN THE SITE AND RESIDENTIAL WELLS.

CONTAMINANTS WERE DETECTED AT ELEVATED LEVELS IN THE MONITORING WELL NEAREST THE SITE, INDICATING CONTAMINATED GROUNDWATER IS MIGRATING OFF-SITE TO THE WEST AND NORTHWEST. HOWEVER, NO

CONTAMINANTS WERE DETECTED IN THE MONITORING WELL GROUP FURTHER DOWNGRADIENT.

FURTHERMORE, CALCULATIONS BASED ON THE POROSITY OF THE AQUIFER AND THE HYDRAULIC GRADIENT ACROSS THE SITE INDICATE THAT THE GROUNDWATER WOULD HAVE TRAVELLED A DISTANCE OF ONLY 300 FEET SINCE THE TIME WASTE OIL WAS INITIALLY DEPOSITED ON THE SITE AROUND 1970.

OUR CONCLUSION IS THAT CONTAMINATED GROUNDWATER HAS MOVED OFF-SITE, BUT HAS NOT MIGRATED TO A POINT WHERE IT WOULD ENDANGER THE DRINKING WATER SUPPLIES OF THOSE RESIDENTS WITH GROUNDWATER WELLS DOWNGRADIENT OF THE SITE.

2) YOU ARE CORRECT IN THAT NO SIGNS HAVE BEEN POSTED TO IDENTIFY THE GEIGER SITE AS BEING A HAZARDOUS WASTE AREA. AS PART OF OUR REMEDIAL INVESTIGATION, A PUBLIC HEALTH EVALUATION (PHE) WAS PERFORMED TO IDENTITY AND ASSESS RISKS TO HUMAN HEALTH POSED BY CONTAMINATION AT THE SITE. THE PHE CONCLUDED THAT NO ADVERSE RISKS TO HUMAN HEALTH WERE ASSOCIATED WITH NORMAL DAY-TO-DAY CONTACT WITH THE CONTAMINATED SOIL. THE SITE IS ON PRIVATE PROPERTY WHICH IS FENCED AND GATED, LIMITING ACCESS TO THE SITE.

3) MORE COMPREHENSIVE TESTING OF RESIDENTIAL WELLS ADJACENT TO THE GEIGER SITE IS NOT FELT TO BE WARRANTED AT THIS TIME. HOWEVER, WELLS IN THIS AREA WILL BE SAMPLED AS PART OF OUR REMEDIAL DESIGN ACTIVITIES, AND WILL BE INCLUDED IN THE LONG-TERM MONITORING WHICH WILL FOLLOW COMPLETION OF OUR REMEDIAL ACTION.

SAMPLING OF RESIDENTIAL WELLS WAS PERFORMED BY THE SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (DHEC) BEFORE COMPLETION OF EPA'S REMEDIAL INVESTIGATION. DHEC'S ANALYSES DETECTED A TRACE AMOUNT OF TRICHLOROETHANE IN ONE RESIDENTIAL WELL. RESAMPLING BY DHEC FAILED TO DETECT ANY CONTAMINANTS IN THIS OR OTHER RESIDENTIAL WELLS.

EPA SAMPLED FOUR RESIDENTIAL WELLS NEAR THE SITE IN 1985. NO ORGANIC COMPOUNDS WERE DETECTED, AND LEVELS OF ALL METALS WERE WELL BELOW THE MAXIMUM CONTAMINANT LEVELS (MCLS) ESTABLISHED UNDER THE FEDERAL SAFE DRINKING WATER ACT. THE TRACE CONTAMINANT DETECTED IN DHEC'S INITIAL SAMPLING EFFORT IS CONSIDERED TO BE A RESULT OF IMPROPER SAMPLING TECHNIQUE, LABORATORY CONTAMINATION, OR INADEQUATE QUALITY CONTROL.

WE HAVE CONCLUDED THAT THE RESIDENTIAL WELLS ADJACENT TO THE SITE ARE NOT CONTAMINATED BY CHEMICALS FROM THE GEIGER SITE.

4) EPA CANNOT RECOMMEND THAT MUNICIPAL WATER BE PROVIDED TO RESIDENTS NEAR THE GEIGER SITE ON THE BASIS OF ENDANGERMENT OF

THE PRESENT WATER SUPPLY BY CONTAMINATION RESULTING FROM THE SITE. OUR REMEDIAL INVESTIGATION DETERMINED THAT CONTAMINATED GROUNDWATER FLOWS AWAY FROM THE RESIDENTIAL WELLS WHICH ARE IMMEDIATELY ADJACENT TO THE SITE, AND HAS NOT REACHED RESIDENTIAL WELLS DOWNGRADIENT OF THE SITE. A THREAT COULD POSSIBLY BE POSED TO THE DOWNGRADIENT WELLS IN THE FUTURE, BUT OUR COURSE OF ACTION WILL RESULT IN REMEDIATION OF THE GROUNDWATER BEFORE IT CAN ENDANGER PRESENT OR FUTURE DRINKING WATER SUPPLIES.

AESTHETIC PROPERTIES SUCH AS TASTE AND APPEARANCE WERE NOT INCLUDED IN THE ANALYSES OF THE RESIDENTIAL WATER SUPPLIES. A PERSON MAY JUDGE WATER QUALITY TO BE LOW BECAUSE OF THESE PROPERTIES, BUT THEY DO NOT CAUSE ADVERSE HEALTH EFFECTS IN HUMANS CONSUMING THIS WATER. AGAIN, MUNICIPAL WATER SUPPLY IS NOT WARRANTED ON THE BASIS OF ENDANGERMENT OF THE PRESENT WATER SUPPLIES BY CONTAMINATION AT THE GEIGER SITE.

THANK YOU FOR YOUR INTEREST IN THE GEIGER (C&M OIL) SITE, AND IN EPA ACTIVITIES. I HOPE YOUR CONCERNS REGARDING THIS SITE HAVE BEEN ANSWERED TO YOUR SATISFACTION. PLEASE DO NOT HESITATE TO CONTACT THIS OFFICE IF YOU HAVE FURTHER QUESTIONS OR WISH ADDITIONAL INFORMATION.

SINCERELY YOURS,

JACK E. RAVAN
REGIONAL ADMINISTRATOR

CC: CHRIS STATON, SCDHEC.

TOWN OF HOLLYWOOD

JANUARY 16, 1987

MR. RUSSELL WRIGHT, CHIEF
REMEDIAL ACTION SECTION
U. S. ENVIRONMENTAL PROTECTION
AGENCY
REGION IV
345 COURTLAND STREET
ATLANTA, GEORGIA 30365

RE: GEIGER (C&M) HAZARDOUS WASTE SITE AT RANTOWLES

DEAR MR. WRIGHT,

AS A RESULT OF THE REMEDIAL INVESTIGATION REPORT DATED JULY 1, 1986 AND THE FINAL FEASIBILITY STUDY DATED JANUARY 9, 1987 ON THE ABOVE SITE, THERE ARE A FEW DISCREPANCIES THAT I FEEL SHOULD BE NOTED FOR

THE RECORD AND YOU WILL FIND THEM ATTACHED AS WELL AS OTHER ATTACHMENTS WHICH WILL ALLOW YOU TO SEE WHY THEY ARE PART OF OUR CONCERNS.

IT MAY SEEM TO YOU THAT WE ARE "NIT PICKING", TO USE A SLANG EXPRESSION; HOWEVER, THIS IS TRULY NOT THE CASE. OUR CONCERNS ARE THE LONG TERM HEALTH AFFECTS OF THE PEOPLE LIVING IN AND AROUND THE IMMEDIATE AREA OF THE GEIGER SITE AND THOSE WHO LIVE ALONG THE LOG BRIDGE CREEK TO THE SOUTHWEST.

I HAD A NUMBER OF PEOPLE COMING BY MY OFFICE AND ALSO A NUMBER OF TELEPHONE CALLS AFTER THE PUBLIC HEARING HERE ON JANUARY 29, 1987. MOST OF THEM ARE LIKE US, THEY ARE APPALLED THAT ANYONE WOULD EVEN SUGGEST THAT THE PEOPLE LIVING IN THE AREA SHOULD CONTINUE TO DRINK WATER FROM THEIR WELLS AFTER THE STUDY REVEALED TRACES OF CONTAMINATES IN THE PRIVATE WELLS THAT WERE LISTED. (SEE ATTACHMENTS). THEY WERE ALSO CONCERNED AS WE ARE THAT THE WELLS IN THE AREA DOWN GRADIENT OF THE SITE WERE NOT TESTED.

I RECEIVED ADVERSE COMMENTS REGARDING THE MANNER IN WHICH MR. CHUCK PIETROSEWICZ HANDLED THE SITUATION AT THE PUBLIC HEARING. THEY WERE AS FOLLOWS; "VERY ARROGANT" "FAILED TO KEEP HIS COOL WHEN QUESTIONED BY THE RESIDENTS LIVING IN THE AREA" "FAILED TO SHOW UNDERSTANDING OF THE CONCERNS OF THE PEOPLE".

I'M AFRAID I MUST SHARE THEIR VIEWS. SINCE IT HAS NOT BEEN MADE CLEAR WHEN THE CLEAN-UP WILL BEGIN, NOR HAS THERE BEEN ANY ASSURANCES THAT THE COURSE OF ACTION TO BE TAKEN WILL IN FACT ELIMINATE THE POSSIBILITY OF FURTHER CONTAMINATION OF THE SOURCE OF DRINKING WATER IN THE FUTURE. THERE WAS NO SUGGESTION, AS I RECALL ANYWHERE IN THE STUDY, THAT THE PEOPLE BE PUT ON THE PUBLIC WATER SYSTEM NOR DID MR. PIETROSEWICZ SUGGEST THAT THIS SHOULD BE A POSSIBILITY.

THIS IS AN AREA WHERE THE PEOPLE ARE DRINKING WATER FROM SHALLOW WELLS WHICH ARE ABOUT 50 OR 60 FEET DEEP. A LETTER WAS SENT TO THE PEOPLE IN THE IMMEDIATE VICINITY BY WAYNE FANNING OF DHEC IN 1985 AND SUGGESTED THAT THE PEOPLE FIND ANOTHER SOURCE OF DRINKING WATER. I THINK MR. FANNING SHOULD BE COMMENDED FOR LETTING THE PEOPLE KNOW THIS. THEY BELIEVED HIM THEN AND THEY STILL BELIEVE IT. THEY ARE STILL CARRYING WATER AFTER ALMOST TWO YEARS.

OUR INITIAL GRANT FOR THE MUNICIPAL WATER SYSTEM WAS IN 1982, COMPLETED IN 1985. THE PEOPLE IN THE AREAS OF THE GEIGER SITE WERE ANNEXED INTO THE TOWN OF HOLLYWOOD JULY 1984. SOME OF THE PEOPLE ALONG HIGHWAY 162 HAVE ACQUIRED THE WATER; HOWEVER, THOSE CLOSEST TO THE GEIGER SITE AND THOSE LIVING IN THE AREA OF LOG BRIDGE CREEK ARE 1200 FEET OR MORE FROM HIGHWAY 162.

I FEEL THAT CONSIDERATION SHOULD BE GIVEN TO THE FACT THAT THESE PEOPLE HAVE BEEN SUBJECTED TO THE POSSIBILITY OF DRINKING WATER THAT HAS TRACES OF CONTAMINATES OVER A PERIOD OF 17 YEARS. THEY FEEL THAT SINCE THIS

HAS GONE ON FOR SO LONG, TO TELL THEM THAT TRACES OF CONTAMINATES ARE WITHIN THE STANDARD LIMITS OF SAFE DRINKING WATER CREATES DOUBT ON THEIR PART. I MUST SAY THAT I WOULD FEEL AS THEY DO IF I LIVED IN THE AREA.

THE GEIGER SITE IS NOT FENCED IN NOR IS THE AREA DESIGNATED AS A HAZARDOUS WASTE SITE. I MUST SAY THAT I AM NOT FAMILIAR WITH THE REQUIREMENT OF THE FEDERAL LAWS IN THIS REGARD, BUT I FEEL THAT THIS SHOULD BE DONE. I FEEL THAT THE DEEDS OF THIS PROPERTY SHOULD BE RESTRICTED TO ALLOW LIMITED USE AND SHOULD NEVER BE ALLOWED TO BE USED AS A RESIDENTIAL AREA. THE DEEDS SHOW THAT THE PROPERTY HAS CHANGED OWNERS THREE TIMES SINCE 1969, WHEN IT BECAME A WASTE SITE. WE ARE INVESTIGATING JUST HOW WE CAN REQUIRE THIS LEGALLY.

THIS AREA IS TRULY A SWAMPY, MARSHY AREA TO THE WEST AND SOUTHWEST OF THE GEIGER SITE AND A FLOOD ZONE THAT IS AFFECTED BY TIDAL FLOODING. (SEE ATTACHMENT). THIS WAS NOT MENTIONED IN THE STUDY.

WE ARE TRYING TO CORRECT THE SITUATION BY PROVIDING SAFE DRINKING WATER. WE ARE APPLYING FOR A COMMUNITY DEVELOPMENT BLOCK GRANT IN THE FY 87 CYCLE.

I TRULY FEEL THAT RECOMMENDATIONS SHOULD BE FORTHCOMING FROM YOUR OFFICE AS TO THE NEED FOR THE MUNICIPAL WATER BEING FURNISHED TO THESE PEOPLE IN THESE TWO AREAS.

I WOULD APPRECIATE HEARING FROM YOU AT THE EARLIEST DATE POSSIBLE.

SINCERELY,

LELA W. DICKERSON
MAYOR OF HOLLYWOOD

ATTACHMENTS.

QUESTIONS AND CORRECTIONS ABOUT THE FEASIBILITY STUDY

EPA FEASIBILITY STUDY -- GEIGER (C&M) SITE

DOCUMENT CONTROL NUMBER 124-FSI DUQS-1
DRAFT DATED JAN 9, 1987

SECTION 1 -- SITE LOCATION AND DESCRIPTION

THE STUDY SHOWS THAT THE GEIGER SITE IS A FIVE ACRE AREA. INCORRECT.

CORRECT: THE GEIGER SITE IS COMPOSED OF TWO PIECES OF PROPERTY AND

THE TOTAL IS 6 1/4 ACRES.

LAST PARAGRAPH PAGE 1-1 THIRD SENTENCE THIRD LINE FROM THE BOTTOM, THE

SENTENCE SHOULD READ.

DRAINS THROUGH AN OUTLET PIPE INTO A STREAM AND MARSH WHICH IS A PART OF THE LOG BRIDGE CREEK SYSTEM. THIS SYSTEM IS A TIDAL SYSTEM WHICH CAN BE AFFECTED BY UNUSUAL FLOOD TIDES.

PAGE 1-5 PARAGRAPH 2 AT TOP OF PAGE .... LAST SENTENCE SHOULD READ AS FOLLOWS ..... SEVERAL RESIDENCES ARE LOCATED TO THE EAST AND NORTHEAST AS WELL AS TO THE SOUTHEAST OF THE IMMEDIATE VICINITY OF THE SITE.

QUESTION: WHAT AFFECT COULD THIS HAVE ON THOSE WHO LIVE IN THE AREA OF LOG BRIDGE CREEK TO THE SOUTH WEST, SINCE THIS IS IN A FLOOD ZONE AREA?

THERE WERE NO TESTS MADE IN THIS AREA. THERE IS ANOTHER AREA TO THE NORTHWEST OF THE GEIGER PROPERTY WHICH IS ALSO IN A FLOOD ZONE AREA. (SEE ATTACHMENT).

PAGE 1-13 PARAGRAPH 1 -- LAST SENTENCE

QUESTION: WHAT IS THE DEPTH OF THE SHALLOW AQUIFER? THIS IS NOT MENTIONED.

1-15 LAST PARAGRAPH ..... QUESTION: WHO DID THE TWO DOWNGRADIENT WELLS THAT WERE TESTED IN 1980 BELONG TO? WHY WEREN'T THE PEOPLE NOTIFIED? WHAT WERE THE RESULTS? WHERE ARE THE RESULTS?

PAGE 2-1 SECTION 2 OF THE REMEDIAL INVESTIGATION DATED JULY 1, 1986

THE TOWN OF RANTOWLES IS APPROXIMATELY ONE MILE NORTHEAST OF THE SITE AND THE TOWN OF HOLLYWOOD IS FOUR MILES OF THE SITE. THIS IS INCORRECT.

RANTOWLES IS A LOCALITY WITHIN THE TOWN LIMITS OF HOLLYWOOD.

PAGE 2-2 LAST PARAGRAPH IS INCORRECT ...

CORRECT STATEMENT ...

THERE IS A BURROW PIT IN CLOSE PROXIMITY TO THE GEIGER PITS IN WHICH OIL DRUMS WERE PLACED AND DRUMS THAT INCLUDED DDT, WHEN DDT WAS BANNED. IT WAS PLACED THERE IN THE 70'S. THE PEOPLE LIVING NEXT TO THE BORROW PIT SAYS THEY ARE STILL THERE. THERE IS ALSO A SAND MINING OPERATION TO THE WEST OF THE SITE, WHICH IS BEING CARRIED TO OTHER AREAS. I DON'T RECALL THAT MONITORING WELLS WERE PLACED IN THESE TWO AREAS. SEE ATTACHMENT.

SECTION 5 .. PAGE 5-6 IS THE STATEMENT THAT LEADS US TO BELIEVE THAT THE PEOPLE LIVING IN THE AREA OF LOG BRIDGE CREEK (ALTA AND GERTRUDE

RD) MAY ALSO HAVE THEIR DRINKING WATER AFFECTED. NO TESTS WERE MADE IN THIS AREA.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV

MAR 10 1987

REF: 4WD-ER

THE HONORABLE LELA W. DICKERSON
MAYOR OF HOLLYWOOD
P.O. BOX 5196
HOLLYWOOD, SOUTH CAROLINA 29449

RE: GEIGER (C&M OIL) SUPERFUND SITE

DEAR MS. DICKERSON:

THANK YOU FOR YOUR RECENT LETTER COMMENTING ON THE GEIGER (C&M OIL) SITE IN CHARLESTON COUNTY, SOUTH CAROLINA. I WOULD LIKE TO TAKE THIS OPPORTUNITY TO RESPOND TO YOUR CONCERNS REGARDING THIS SITE. I HAVE OUTLINED YOUR COMMENTS BELOW, FOLLOWED BY OUR REPLIES.

1) "IT HAS NOT BEEN MADE CLEAR WHEN THE CLEAN-UP WILL BEGIN, NOR HAS THERE BEEN ANY ASSURANCES THAT THE COURSE OF ACTION TO BE TAKEN WILL IN FACT ELIMINATE THE POSSIBILITY OF FURTHER CONTAMINATION OF THE SOURCE OF DRINKING WATER IN THE FUTURE.".

THE SELECTION OF A REMEDIAL ALTERNATIVE IS EXPECTED TO BE MADE NEAR THE END OF MARCH 1987. REMEDIAL DESIGN IS SCHEDULED TO BEGIN BY DECEMBER 1987 AND WILL TAKE APPROXIMATELY ONE YEAR TO COMPLETE. THE AMOUNT OF TIME THE ACTUAL SITE CLEAN-UP WILL TAKE IS DEPENDENT UPON WHICH ALTERNATIVE IS SELECTED. I REFER YOU TO THE TRANSCRIPT OF THE JANUARY 19 PUBLIC MEETING, PAGES 51 AND 52, FOR A DISCUSSION BY EPA OF THE EXPECTED REMEDIAL ACTION TIME-FRAME.

THE SELECTED REMEDIAL ACTION WILL ASSURE THAT DRINKING WATER SUPPLIES DO NOT BECOME CONTAMINATED BY THE SITE IN THE FUTURE.

2) "THERE WAS NO SUGGESTION ANYWHERE IN THE STUDY THAT THE PEOPLE BE PUT ON THE PUBLIC WATER SYSTEM, NOR DID MR. (PIETROSEWICZ) SUGGEST THAT THIS SHOULD BE A POSSIBILITY.".

THE REMEDIAL INVESTIGATION DETERMINED THAT RESIDENTIAL WELLS ARE NOT IMMEDIATELY THREATENED BY CONTAMINATION FROM THE GEIGER SITE; THUS, AN ALTERNATE DRINKING WATER SUPPLY IS NOT NECESSARY. THE AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR) ALSO CONCLUDED THAT THE RESIDENTIAL WELLS ARE NOT ENDANGERED, WHICH IS WHY CHUCK PIETROSEWICZ,

OF ATSDR, DID NOT RECOMMEND THAT THE RESIDENTS BE SUPPLIED WITH MUNICIPAL WATER.

3) "A LETTER WAS SENT TO THE PEOPLE IN THE IMMEDIATE VICINITY BY WAYNE FANNING OF DHEC IN 1985 AND SUGGESTED THAT THE PEOPLE FIND ANOTHER SOURCE OF DRINKING WATER.".

DHEC'S LETTER TO LOCAL RESIDENTS WAS SENT IN JUNE OF 1985, BEFORE THE RESULTS OF EPA'S REMEDIAL INVESTIGATION WERE RELEASED. THE RECOMMENDATION THAT ANOTHER SOURCE OF DRINKING WATER BE FOUND WAS A PRECAUTION THAT WAS SUGGESTED BASED ON DATA FROM ONE SAMPLING EFFORT. SUBSEQUENT SAMPLING FAILED TO DETECT CONTAMINANTS IN THE RESIDENTIAL WELLS, AND THE REMEDIAL INVESTIGATION CONFIRMED THAT CONTAMINATED GROUNDWATER IS FLOWING AWAY FROM THE RESIDENTIAL WELLS ADJACENT TO THE SITE. THE CONTAMINANTS DETECTED BY DHEC IN THEIR 1985 SAMPLING MAY BE ATTRIBUTED TO IMPROPER SAMPLING TECHNIQUE OR LABORATORY CONTAMINATION.

4) "I FEEL THAT CONSIDERATION SHOULD BE GIVEN TO THE FACT THAT THESE PEOPLE HAVE BEEN SUBJECTED TO THE POSSIBILITY OF DRINKING WATER THAT HAS TRACES OF (CONTAMINANTS) OVER A PERIOD OF 17 YEARS.".

AGAIN, WE HAVE CONCLUDED THAT THE RESIDENTIAL WELLS IN THE SITE AREA ARE NOT RECEIVING CONTAMINANTS FROM THE SITE, AND THE TRACE SUBSTANCES DETECTED BY DHEC IN 1985 ARE THE RESULT OF IMPROPER SAMPLING OR OF LABORATORY ERROR.

5) "THE GEIGER SITE IS NOT FENCED IN NOR IS THE AREA DESIGNATED AS A HAZARDOUS WASTE SITE. I FEEL THAT THIS SHOULD BE DONE. I FEEL THAT THE DEEDS OF THIS PROPERTY SHOULD BE RESTRICTED TO ALLOW LIMITED USE AND SHOULD NEVER BE ALLOWED TO BE USED AS A RESIDENTIAL AREA.".

THE SITE DOES NOT POSE ANY ADVERSE RISKS TO HUMAN HEALTH UNDER PRESENT-USE CONDITIONS. AN ADVERSE HEALTH RISK WOULD BE POSED BY CONTAMINATED SOIL ONLY IF THE SITE WERE TO BE EXCAVATED OR IF THE OIL-STAINED AREA WERE TO BE USED FOR RESIDENTIAL PURPOSES. THE SITE IS PRIVATELY OWNED AND IS USED FOR THE STORAGE OF HEAVY EQUIPMENT. ACCESS IS RESTRICTED TO THOSE WHO WORK AT THE SITE. FENCING OF THE SITE TO CONTROL ACCESS IS NOT NECESSARY FOR THE PROTECTION OF HUMAN HEALTH.

FOLLOWING REMEDIATION OF THE SITE, DEEDS TO THE AFFECTED PROPERTIES MAY BE CHANGED TO RESTRICT THE USE OF THE SITE IF NECESSARY. IF A PERMANENT REMEDY IS SELECTED WHICH DESTROYS THE HAZARDOUS SUBSTANCES, NO RESTRICTIONS WILL BE REQUIRED.

6) "THE AREA IS TRULY A SWAMPY, MARSHY AREA TO THE WEST AND SOUTHWEST OF THE GEIGER SITE AND A FLOOD ZONE THAT IS AFFECTED BY TIDAL FLOODING. THIS WAS NOT MENTIONED IN THE STUDY.".

THE GEIGER SITE ITSELF IS NOT AFFECTED BY TIDAL FLOODING, AND IS NOT SIGNIFICANTLY INFLUENCED BY THESE OTHER AREAS. THE MARSHY AREAS WEST OF

THE SITE WERE SAMPLED TO DETERMINE THE PRESENCE OF CONTAMINATION IN THESE AREAS.

7) "I TRULY FEEL THAT RECOMMENDATIONS SHOULD BE FORTHCOMING FROM YOUR OFFICE AS TO THE NEED FOR THE MUNICIPAL WATER BEING FURNISHED THESE PEOPLE IN THESE TWO AREAS.".

AS STATED ABOVE, RESIDENTIAL WELLS IN THE AREA OF THE GEIGER SITE ARE NOT RECEIVING CONTAMINANTS FROM THE SITE, AND ARE NOT IMMEDIATELY ENDANGERED BY THE SITE. OUR REMEDIAL ACTION WILL ASSURE THAT THESE WELLS ARE NOT THREATENED IN THE FUTURE BY SITE CONTAMINATION. WE CANNOT RECOMMEND THAT MUNICIPAL WATER BE SUPPLIED TO LOCAL RESIDENTS ON THE BASIS OF CONTAMINATION EXISTING AT THE GEIGER (C&M OIL) SITE.

8) "THE STUDY SHOWS THAT THE GEIGER SITE IS A FIVE ACRE AREA. INCORRECT. THE GEIGER SITE IS COMPOSED OF TWO PIECES OF PROPERTY AND THE TOTAL IS 6-1/4 ACRES.".

THE FINAL FEASIBILITY STUDY WILL BE CORRECTED.

9) "LAST PARAGRAPH, PAGE 1-1, THIRD SENTENCE, THIRD (LINE) FROM THE BOTTOM; THE SENTENCE SHOULD READ: '... DRAINS THROUGH AN OUTLET PIPE INTO A STREAM MARSH WHICH IS A PART OF THE LOG BRIDGE CREEK SYSTEM. THIS SYSTEM IS A TIDAL SYSTEM WHICH CAN BE AFFECTED BY UNUSUAL FLOOD TIDES.'".

THE FINAL FEASIBILITY STUDY WILL BE REVISED TO SHOW THAT THE DRAINAGE STREAM IS PART OF THE LOG BRIDGE CREEK SYSTEM. THE FACT THAT THIS SYSTEM CAN BE AFFECTED BY TIDES DOES NOT HAVE AN IMPACT ON OUR INVESTIGATION.

10) "PAGE 1-5, PARAGRAPH 2; LAST SENTENCE SHOULD READ AS FOLLOWS: 'SEVERAL RESIDENCES ARE LOCATED TO THE EAST AND NORTHEAST AS WELL AS TO THE SOUTHEAST OF THE IMMEDIATE VICINITY OF THE SITE.'".

THIS SECTION OF THE FEASIBILITY STUDY PRESENTS A DESCRIPTION OF THE SITE AND THE IMMEDIATE AREA. THE RESIDENCES TO THE SOUTHEAST OF THE SITE AREA ARE NOT CONSIDERED A PART OF THE IMMEDIATE AREA AND ARE NOT INCLUDED IN THIS DISCUSSION. A MORE COMPLETE DISCUSSION OF AREA-WIDE LAND USE MAY BE FOUND IN THE REMEDIAL INVESTIGATION REPORT.

11) "WHAT EFFECT COULD THIS HAVE ON THOSE WHO LIVE IN THE AREA OF LOG BRIDGE CREEK TO THE SOUTHWEST, SINCE THIS IS IN A FLOOD ZONE AREA? THERE WERE NO TESTS MADE IN THIS AREA. THERE IS ANOTHER (AREA) TO THE NORTHWEST OF THE GEIGER PROPERTY WHICH IS ALSO IN A FLOOD ZONE AREA.".

AS STATED EARLIER, THESE FLOOD ZONES HAVE NO DIRECT EFFECT ON THE GEIGER SITE.

12) "WHAT IS THE DEPTH OF THE SHALLOW AQUIFER?".

THE SHALLOW AQUIFER INCLUDES ALL OF THE SURFICIAL UNCONSOLIDATED SEDIMENTS FROM THE GROUND SURFACE DOWN TO THE COOPER MARL, WHICH

UNDERLIES THE SHALLOW AQUIFER AT A DEPTH OF APPROXIMATELY FORTY FEET.

13) "WHO DID THE TWO DOWNGRADIENT WELLS THAT WERE TESTED IN 1980 BELONG TO? WHY WEREN'T THE PEOPLE NOTIFIED? WHAT WERE THE RESULTS? WHERE ARE THE RESULTS?".

INFORMATION REGARDING THE 1980 TESTING IS CONTAINED IN THE FOLLOWING REFERENCE: STUDY PLAN, HAZARDOUS WASTE INVESTIGATION, C&M OIL; SURVEILLANCE AND ANALYSIS DIVISION, EPA, REGION IV, ATLANTA, GEORGIA; 1980. OWNERSHIP OF THESE WELLS IS NOT KNOWN. NO HAZARDOUS SUBSTANCES WERE DETECTED IN EITHER OF THESE WELLS. THE REASON FOR NOT NOTIFYING THE RESIDENTS OF THE RESULTS IS NOT KNOWN.

14) "THERE IS A BORROW PIT IN CLOSE PROXIMITY TO THE GEIGER PITS IN WHICH OIL DRUMS WERE PLACED, AND DRUMS THAT INCLUDED DDT. THE PEOPLE LIVING NEXT TO THE BORROW PIT SAY THEY ARE STILL THERE.".

EPA CONDUCTED AN INVESTIGATION FOR BURIED DRUMS AT THE GEIGER SITE ON FEBRUARY 19, 1987. MS. PEGGY DUKES, A MEMBER OF YOUR STAFF, WAS QUESTIONED ABOUT THE BORROW PIT AND SHE REPLIED THAT NO DRUMS WERE PLACED IN THE PIT. RESIDENTS LIVING ADJACENT TO THE SITE WERE ASKED IF BURIED DRUMS COULD BE LOCATED IN ANY AREAS OTHER THAN THOSE INVESTIGATED BY EPA. THESE RESIDENTS SAID THAT ALL SUSPECT AREAS HAD BEEN INVESTIGATED.

15) "THERE IS ALSO A SAND MINING OPERATION TO THE WEST OF THE SITE, WHICH IS BEING CARRIED TO OTHER AREAS. I DON'T RECALL THAT MONITORING WELLS WERE PLACED IN THESE TWO AREAS.".

THE SAND MINING OPERATION IS NOT PART OF THE GEIGER SITE, AND WOULD NOT BE AFFECTED BY THE SITE; THEREFORE, NO MONITORING WELLS WERE PLACED IN THIS AREA. THE BORROW PIT IS ALSO NOT PART OF THE SITE, AND THERE WAS NO EVIDENCE OF WASTE DUMPING AT THIS LOCATION AT THE TIME OF THE REMEDIAL INVESTIGATION.

16) "IN SECTION 5, PAGE 5-6, A STATEMENT LEADS US TO BELIEVE THAT THE PEOPLE LIVING IN THE AREA OF LOG BRIDGE CREEK MAY ALSO HAVE THEIR DRINKING WATER AFFECTED. NO TESTS WERE MADE IN THIS AREA.".

THE DISCUSSION ON PAGE 5-6 OF THE REMEDIAL INVESTIGATION REPORT CONCERNS SURFACE WATER AND SEDIMENT SAMPLE RESULTS. SURFACE WATER AND SEDIMENT CONTAMINATION AT THE INDICATED LEVELS WOULD NOT DEGRADE THE QUALITY OF THE GROUNDWATER.

I HOPE THIS ANSWERS YOUR CONCERNS SATISFACTORILY. I WOULD LIKE TO THANK YOU FOR YOUR INTEREST IN THE GEIGER (C&M OIL) SITE AND IN EPA ACTIVITIES. PLEASE CONTACT THOMAS ROTH OF MY STAFF AT (404) 347-2643 IF

YOU HAVE ANY FURTHER QUESTIONS.

SINCERELY,

RUSSELL WRIGHT, CHIEF
REMEDIAL ACTION SECTION
EMERGENCY AND REMEDIAL RESPONSE BRANCH

CC: CHRIS STATON, SCDHEC.

(ATTACHMENT)
STATE COST-SHARING OBLIGATIONS
GEIGER (C&M OIL) SITE

	EPA	STATE	TOTAL
DESIGN	1,116,700-1,224,100	0	1,116,700-1,224,100
CAPITAL COSTS	4,019,900-4,406,600	446,700-489,700	4,466,600-4,896,300
IMPLEMENTATION	869,800-1,085,100	96,600-120,600	966,400-1,205,700
FIRST-YEAR MONITORING	101,000	11,200	112,200
LONG-TERM MONITORING	0	255,100	255,100
TOTAL	6,107,400-6,816,800	809,600-876,600	6,917,000-7,693,400.

(ATTACHMENT)
TABLE 1

INDICATOR CHEMICAL CONCENTRATIONS IN SOIL
PROTECTIVE OF GROUNDWATER

INDICATOR CHEMICAL	GROUNDWATER CLEANUP LEVEL, CGW (UG/LITER)	CONCENTRATION IN INFILTRATION, CP	PARTITION COEFFICIENT KD (ML/G)	PROTECTIVE SOIL CONCENTRATION, CS (UG/KG)
BENZO(A)PYRENE	0.003	0.011	A9,749	107
BENZ(A)ANTHRACENE	0.003	0.011	A1,256	14
BENZO(B AND/OR K)FLUORANTHENE	0.003	0.011	A1,545	17
PCB (AROCLOR 1254)	0.0079	0.029	B3,626	105
BENZENE	1.2	4.44	C0.325	1.44
TRANS-1,2-DICHLOROETHYLENE	70	259	C0.295	76
CHROMIUM	50	185	D20	3,700
LEAD	50	185	E900	166,500

TOLUENE	175	647.5	C1.5	971
1,2-DICHLOROBENZENE	15.8	58.5	C8.5	497
1,1-DICHLOROETHANE	5	18.5	C0.15	2.78

A CALLAHAN ET AL. (1979), RADDING ET AL. (1976), VERSCHUEREN (1983)

B WEBER ET AL. (1983)

C EPA (1986)

D BAES AND SHARP (1983), GERRITSE (1982)

E BAES ET AL. (1984)

NOTE: PERCENT ORGANIC CARBON ASSUMED TO BE 0.5% FOR DERIVATION OF COEFFICIENTS FOR ORGANIC CHEMICALS

GROUNDWATER CLEANUP LEVELS PROVIDED BY EPA.

TABLE 1

MAXIMUM CONCENTRATIONS OF CHEMICALS DETECTED
IN SURFACE SOIL SAMPLES
GEIGER (C&M OIL) SITE
CHARLESTON, SOUTH CAROLINA

CHEMICAL	CONCENTRATION (UG/KG)	BACKGROUND RANGE
BENZO(A)ANTHRACENE	560	ND
BENZO(A)PYRENE	240	ND
BENZO(B AND/OR K) FLUORANTHENE	2000	ND
CHRYSENE	1200	ND
PCB (AROCLOR 1254)	4000	ND
1,1-DICHLOROETHANE	9.6	ND
TOLUENE	460	ND
1,1,1-TRICHLOROETHANE	36	ND
TRICHLOROETHYLENE	230	ND

ETHYLBENZENE	17	ND
LEAD	740 MG/KG	3.9 - 8 MG/KG

MERCURY	1.3 MG/KG	ND
CHROMIUM	1100 MG/KG	3.6 - 4.5 MG/KG

ND - NOT DETECTED.

TABLE 2

CONTAMINANTS DETECTED IN MONITOR WELLS
GEIGER (C&M OIL) SITE
CHARLESTON, SOUTH CAROLINA

WELL NUMBER	CONTAMINANT	CONCENTRATION (UG/L)
MW 1S	ARSENIC	6
MW 1M	ARSENIC	8
	CHLOROFORM (1)	5 J
MW 1D	DI-N-OCTYLPHTHALATE	3 J
	CHLOROFORM (1)	32
MW 2S	CHLOROFORM (1)	20
MW 2M	BROMODICHLOROMETHANE (1)	1 J
MW 2D	DIMETHYL PHTHALATE	11
	CHLOROFORM (1)	22
	BENZENE	0.8 J
	ARSENIC	66
MW 3S	ARSENIC	42
	DI-N-OCTYLPHTHALATE	3 J
	CHLOROFORM (1)	14
MW 3M	CHLOROFORM (1)	2 J
	BIS(2-ETHYLHEXYL) PHTHALATE (2)	1200
MW 3D	CHLOROFORM (1)	8
MW 4S	1,2-DICHLOROBENZENE	2 J
	NAPHTHALENE	18
	ISOPHORONE	1 J
	BENZOIC ACID (2)	18 J
	2-METHYLPHENOL	32
	4-METHYLPHENOL	71
	2-METHYL NAPHTHALENE	8 J
	CHLOROETHANE	250
	1,1-DICHLOROETHANE	130 J
	TRANS-1,2-DICHLOROETHYLENE	53 J
	BENZENE	25 J

	TOLUENE	2000
	TOTAL XYLENES	25J

TABLE 2 (CONTINUED)

CONTAMINANTS DETECTED IN MONITOR WELLS
GEIGER (C&M OIL) SITE
CHARLESTON, SOUTH CAROLINA

WELL NUMBER	CONTAMINANT	CONCENTRATION (UG/L)
MW 4M	BENZOIC ACID (2)	4 J
	CHLOROFORM	1 J
	BENZENE	0.5 J
MW 4D	CHLOROFORM (1)	7 J
	BENZENE	0.4 J
MW 5S	2,4-DIMETHYLPHENOL	20
	BENZENE	5 J
	TOLUENE	1 J
	LEAD (3)	53
MW 5M	NOT DETECTED	
MW 5D	1,1-DICHLOROETHENE	3 J
	CHLOROFORM (1)	20
MW 6S	TOLUENE (3) (4)	5.3
	LEAD (3) (2)	250
	CADMIUM (3) (4)	13
MW 6M	NOT DETECTED	
MW 6D	NOT DETECTED	

(1) - FOUND IN DRILLING WATER
(2) - LABORATORY CONTAMINANT OR NATURAL DEGRADATION PRODUCT
(3) - SEDIMENT IN SAMPLE
(4) - COMPOUNDS NOT FOUND IN DUPLICATE SAMPLE

J - ESTIMATED VALUE.

AMENDED 12 JUNE 1987

TABLE 3

GROUNDWATER CLEANUP GOALS
FOR INDICATOR CHEMICALS

GEIGER (C&M OIL) SITE

INDICATOR CHEMICAL	MAXIMUM DETECTED (UG/L)	GROUNDWATER CLEANUP LEVEL (UG/L)	CRITERIA

BENZO (A) PYRENE	ND	0.03	B
BENZO (A) ANTHRACENE	ND	0.03	B
BENZO (B AND/OR K) FLUORANTHENE	ND	0.03	B
PCB (AROCLOR 1254)	ND	0.079	B
BENZENE	25	5	A
TRANS-1,2-DICHLOROETHYLENE	53	70	A
CHROMIUM	ND	50	D
LEAD	53	50	D
TOLUENE	2000	175	C
1,1-DICHLOROBENZENE	2	15.8	C
1,1-DICHLOROETHANE	130	5	E

CRITERIA

A - PROPOSED RECOMMENDED MAXIMUM CONTAMINANT LEVEL (PRMCL OR MCLG)
FEDERAL REGISTER, VOL. 50, NO. 219, NOVEMBER 13, 1985, 46935
B - EQUIVALENT TO 10-5 CANCER RISK
C - AQUATIC LIFE CHRONIC TOXICITY VALUE
D - MAXIMUM CONTAMINANT LEVEL (MCL)
E - REQUIRED CLP DETECTION LEVEL.

TABLE 4

PRELIMINARY
SOIL CLEANUP GOALS
FOR INDICATOR CHEMICALS

GEIGER (C&M OIL) SITE

INDICATOR CHEMICAL	MAXIMUM DETECTED (UG/KG)	CLEANUP GOAL (UG/KG)
BENZO (A) PYRENE	240	1,070

* BENZO (A) ANTHRACENE	560	140
* BENZO (B AND/OR K) FLUORANTHENE	2000	170

* PCB (AROCLOR 1254)	4000	1,050
BENZENE	ND	14.4
TRANS-1,2-DICHLOROETHYLENE	ND	76
* CHROMIUM	1100 MG/KG	3.7 MG/KG
* LEAD	740 MG/KG	166.5 MG/KG
TOLUENE	460	971
1,1-DICHLOROBENZENE	ND	497
* 1,1-DICHLOROETHANE	9.6	2.78

ND - NOT DETECTED

* - MAXIMUM DETECTED CONCENTRATION IS GREATER THAN THE PRELIMINARY CLEANUP GOAL.

TABLE 5

TECHNOLOGIES CONSIDERED FOR SCREENING
GEIGER (C&M OIL) SITE
CHARLESTON, SOUTH CAROLINA

POSSIBLE TECHNOLOGIES	ELIMINATED (E) OR RETAINED (R)	IF ELIMINATED REASON FOR DOING SO
I. GROUNDWATER TECHNOLOGIES		
A. GROUNDWATER CONTAINMENT		
1. SLURRY WALL	R	
2. GROUT CURTAINS	E	MORE EXPENSIVE AND LESS EFFECTIVE THAN SLURRY WALLS
B. GROUNDWATER RECOVERY		
1. PUMPING (EXTRACTION WELLS)	R	
2. SUBSURFACE DRAINS	E	HYDRAULIC CONDUCTIVITY MAY BE HIGH

C. GROUNDWATER TREATMENT		
1. FLOCCULATION/SEDIMENTATION	R	

2. FILTRATION	R	
3. AIR STRIPPING	R	
4. SPRAY IRRIGATION	R	
5. ACTIVATED CARBON ADSORPTION	R	
6. ION EXCHANGE/SORPTIVE RESINS	R	
7. REVERSE OSMOSIS	E	EXPENSIVE, DILUTE WASTE STREAM
8. BIOLOGICAL TREATMENT	R	
D. GROUNDWATER DISPOSAL		
1. DISCHARGE TO SURFACE WATER	R	
2. REINJECTION	E	COMPLEX AND EXPENSIVE COMPARED TO SURFACE DISCHARGE
3. PUMP TO LOCAL WASTEWATER TREATMENT PLANT	R	

TABLE 5 (CONTINUED)

POSSIBLE TECHNOLOGIES	ELIMINATED (E) OR RETAINED (R)	IF ELIMINATED, REASON FOR DOING SO
II. SOIL TECHNOLOGIES		
1. EXTRACTION (SOIL FLUSHING)	E	NOT APPLICABLE TO WASTE CHARACTERISTICS
2. SOLIDIFICATION/STABILIZATION	R	
3. ATTENUATION	E	NOT APPLICABLE TO SITE CHARACTERISTICS
4. IMMOBILIZATION	E	UNKNOWN RELIABILITY AND EFFECTIVENESS
5. INCINERATION	R	
6. CAPPING	R	
7. VEGETATIVE COVER	R	
8. EXCAVATION AND OFF-SITE DISPOSAL	R	
9. PARTIAL EXCAVATION WITH ON-SITE DISPOSAL	R	
10. ON-SITE CONTAINMENT/ENCAPSULATION	R.	

TABLE 6

SUMMARY OF PRESENT WORTH COSTS
GEIGER (C&M OIL) SITE
CHARLESTON, SOUTH CAROLINA

REMEDIAL ALTERNATIVES	CAPITAL COST $1000	PRESENT WORTH O&M COST $1000	TOTAL PRESENT WORTH COST $1000
GROUNDWATER ALTERNATIVES:			
A-1 EXTRACTION, AIR STRIPPING AND DISPOSAL (1)	392 (756)	1,334 (1,474)	1,726 (2,230)
A-2 EXTRACTION, FLOCCULATION/ SEDIMENTATION, FILTRATION, CARBON ADSORPTION, AND DISPOSAL	930	1,573	2,503
A-3 EXTRACTION AND TREATMENT AT POTW	833	670	1,504
A-4 SLURRY WALL AND CAP	4,328	626	4,954
SOILS ALTERNATIVES:			
B-1 CAP	567	405	972
B-2 VEGETATIVE COVER	214	405	619
GRAVEL COVER	256	397	653
B-3 PARTIAL EXCAVATION AND CAP	614	405	1,019
B-4 PARTIAL EXCAVATION AND VEGETATIVE COVER	261	405	666
GRAVEL COVER	312	397	710
B-5 EXCAVATION, ON-SITE INCINERATION, AND SOLIDIFICATION/STABILIZATION	5,191	367	5,558
B-6 EXCAVATION AND OFF-SITE DISPOSAL	3,910	367	4,277
NO ACTION	0	0	0
NO ACTION WITH MONITORING	0	367	367

(1) NUMBERS IN PARENTHESES INCLUDE COST FOR FLOCCULATION/SEDIMENTATION.

TABLE 7

STATE COST-SHARING OBLIGATIONS

GEIGER (C&M OIL) SITE

	EPA	STATE	TOTAL
DESIGN	1,116,700-1,224,100	0	1,116,700-1,224,100
CAPITAL COSTS	4,019,900-4,406,600	446,700-489,700	4,466,600-4,896,300
IMPLEMENTATION	869,800-1,085,100	96,600-120,600	966,400-1,205,700
FIRST-YEAR MONITORING	101,000	11,200	112,200
LONG-TERM MONITORING	0	255,100	255,100
TOTAL	6,107,400-6,816,800	809,600-876,600	6,917,000-7,693,400.